BULLETIN 267 DECEMBER, 1911

MICHIGAN

AGRICULTURAL COLLEGE

EXPERIMENT STATION

BOTANICAL DEPARTMENT

MICHIGAN WEEDS

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BY

W. J. BEAL.

EAST LANSING, MICHIGAN.
1911

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MICHIGAN AGRICULTURAL EXPERIMENT STATION

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Chatham, Alger County, 160 acres deeded—Leo. M. Geismar in charge.
Grayling, Crawford County, 80 acres deeded.
South Haven, Van Buren County, 10 acres rented; 5 acres deeded—Frank A. Wilkin in charge.

FOREWORD.

This bulletin is a companion to number 260, published March, 1910, which was entitled *Seeds of Michigan Weeds,* and the two can profitably be studied together.

The aim has been not to repeat much that has been so recently published.

Very nearly all the drawings were made by F. Schuyler Mathews of Cambridge, Massachusetts. Figures 2, 3, 4, 4a, 8, 10, 11, 12, 16, 19, 20, are taken from Bulletins by the U. S. Dept. of Agriculture.

I am indebted to Dr. B. L. Robinson and M. L. Fernald of the Gray Herbarium of Harvard University for valuable hints and access to numerous herbarium specimens.

In all the plans made for extermination of weeds do not forget that when buried in the soil, a portion of the seeds of many weeds will retain their vitality for 30 years at least.

Two numbers are given to most of the illustrations, the one in parenthesis is the number corresponding to that of the cut in bulletin 260.

In the study of weeds as in the study of other plants it is well to group them according to some of their points of agreement.

In this treatise, I have given a brief popular account of each family that contains one or more weeds here illustrated.

Placing these cuts one to three to the page according to shape and size makes it impossible in many cases to arrange the species in approved sequence. In spelling and capitals I follow Gray's Manual, 7th Edition.

In the back part of the bulletin are duplicate copies of the decimal scale that any one can cut out and use for a measure, though these figures are not all natural size.

W. J. BEAL.

OBJECT OF THIS BULLETIN.

This bulletin is not intended as a full text concerning weeds and remedies for disposing them; the chief object is to furnish illustrations that will aid students in school and college and farmers out of school to recognize some of the more striking weeds.

The descriptions are purposely short and mostly popular. The botanist will not need the text, but will consult a reliable text book such as *Gray's Manual of Botany, 7th Edition.* The person not trained in botany will get little from the text. In case of the "pictures," in many cases they will not be very satisfactory to the uninitated.

I hope that bulletin 260 and the present one will induce a few farmers at least to adopt better methods.

While I cannot predict what new weeds may be introduced, thrive and spread in Michigan, I have included several not yet prominent because of their bad record in near-by regions.

No person can know better than I do the very rapid increase in the number of weeds on Michigan farms. As a rule each farm is annually getting more sorts of weeds and as each farmer is cultivating weeds, these are becoming more freely distributed in every field and along every roadside.

EXPERIENCE OF THE GERMANS AND ENGLISH.

What has been the experience of older countries, such as Germany and Great Britain? Previous to 1860, it was a very common practice to mix old seeds with new of the same variety. The old seeds will not grow, or most generally if they do grow they produce inferior plants. Another common practice is to kill seeds of charlock by boiling or baking, then assort the seeds into two sizes by means of a sieve. The larger seeds were used to mix with rutabagas, the smaller with turnip seeds. In such cases all the seeds which grow are good, but the purchaser is deceived in the quantity he buys and in the amount of which he sows on a given space. Old seeds, or seeds of another variety, were often dyed and used to adulterate good seeds of red clover and other species. Sulphur-smoking is often resorted to, to renovate the appearance of worthless old grass seed. Some seeds are dressed with oil for a similar purpose. There were many experts in the business who carried on a regular exchange in doctored seeds.

In a case in Germany, 59 per cent of seeds corresponded to the labels under which the articles were sold, and only 18.3 per cent were capable of germination. A sample of orchard grass contained 39 other species of seeds. In a sample sold for Meadow Foxtail, only one-half the seeds were of this species, and of the genuine seeds only 5 per cent were alive and capable of germinating, so that 100 lbs. of the seeds as sold furnished 50 lbs. of inferior, worthless, or injurious foreign seeds and only 2½

lbs. of seeds capable of producing plants of the species for which they were sold. All the samples referred to came from dealers who ranked among "the reliable" in Germany. In 1868 over 3 tons of so-called red clover seed were sold to farmers in the Saxon city of Chemnitz alone, of which two-thirds was yellow clover. Of 51 specimens of red clover seed, 31 were found to contain seeds of the dodder, "the destructive (parasitic) enemy of the clover plant." In another case, "of samples of timothy seed, the best yielded 99 per cent of sound seeds, the poorest 15 per cent, while the average was 82 per cent." To the tradesmen "troublesome questions are put if the seed is found better or worse one year than another," so they get accustomed to adulterating and keeping seeds of about the same average year after year. One advantage of using dead seeds is that they tell no tales in the shape of feeble plants, or of plants other than the variety desired. In Prussia at present, government experts are appointed to test seeds for merchants and for farmers and gardeners.

In Germany, one or more firms, formerly at least, ground up quartz, sifted it and colored it to resemble seeds of red clover, with which it was mixed. It requires close examination with a miscroscope to detect the quartz from the clover seed.

In 1869, it is estimated that in England alone, 20,000 bushels of poor turnip seed was sown mixed with good seeds. A few brief experiments will enable anyone to tell which seeds are dead and which will grow, but it requires more time to tell which are weak and which are strong, or to tell which are true and which untrue to the name put on the package.

There appeared at one time, and perhaps it still exists, an organized agreement among seedmen of England, with perhaps some exceptions, to adulterate certain sorts of seeds to just such an extent. Pure fresh seed they quote as "net seed," while dead seed is quoted as "tri" or "000." In some seasons they agree to adulterate cauliflower so that a package shall contain only 50 to 60 per cent of good seeds. At one time 18 packages of seeds of cauliflower were taken to contain from 86 to 24 per cent of good seeds, averaging 51 per cent; 18 samples of seeds of broccoli ranged from 86 to 35 per cent, averaging 51 per cent; 18 of carrot seeds ranged from 61 to 14, and averaged 40 per cent of good seeds. The same number of packages of white turnip seed ranged from 98 to 57, averaging 74 per cent of living seeds.

In Great Britain they now have a law passed making it a fine of not over five pounds for the first offense and fifty pounds for the second offense to dye or kill and sell worthless seeds. Besides the fine, the court has authority to advertise the name of the offender in any newspaper at the expense of the guilty party. No wonder those who manage farms in Germany, England and other old countries chafed under this imposition. They agitated the subject and began to enact laws with penalties attached to them. If I mistake not, the first seed-control station was started by Dr. Nobbe of Saxony in 1869 and many others have followed.

Adulterations of seeds were discovered most ingenious in character, harmful in effect, and remarkable in amount.

Since 1871, members of the Royal Agricultural Society of England have among their officers a consulting botanist, William Caruthers, 44

Central Hill, Norwood, London, S. E., who made his first report in 1872, and continued in service certainly until 1905. His successor is still acting in the same capacity. Members of the society can avail themselves of his advice by paying a small fee varying in amount according to the service rendered. Although but few farmers avail themselves of the advice of the consulting botanist, the purity and quality of grass seeds and those of other forage plants, rapidly improved, until today there is very little cause for complaint.

WEED SEEDS OFTENEST MET WITH IN CLOVER SEED.

In the year 1910, 122 lots of seeds of red clover were selected by our agent where offered by the merchant for sale. These were examined at the Agricultural College and 51 kinds of seeds of weeds were detected. Nine samples only of the whole number contained no weeds.

Seventy samples of clover seed contained seeds of *Setaria viridis* (green foxtail).

Sixty samples contained *Plantago lanceolata* (buckhorn).

Fifty-eight samples contained *Plantago Rugelii* (Rugel's plantain).

Fifty samples contained *Rumex crispus* (narrow-leaved dock).

Forty-six samples contained *Rumex Acetosella* (sheep sorrel).

Thirty-six samples contained *Polygonum Persicaria* (lady's thumb).

Thirty samples contained *Chenopodium album* (lamb's quarters).

Twenty-three samples contained *Plantago major* (one of the broad-leaved plantains).

Twenty-three samples contained *Echinochloa crus-galli* (barnyard grass).

Twenty-one samples contained *Ambrosia artemisiifolia* (common ragweed).

Seventeen samples contained *Panicum capillare* (hair grass).

Sixteen samples contained *Digitaria sanguinalis* (crab grass).

Fifteen samples contained *Potentilla monspeliensis.*

Fourteen samples contained *Amaranthus retroflexus* (our most common rough pigweed).

Thirteen samples contained *Lepidium virginicum* (one of the pepper grasses).

Nine samples contained *Setaria glauca* (yellow foxtail or pigeon grass).

Nine samples contained *Stellaria media* (our most common chickweed).

Eight samples contained *Nepeta Cataria* (catmint or catnip).

Seven samples contained *Lepidium apetalum* (a small pepper grass).

Six samples contained *Prunella vulgaris* (self heal).

Five samples contained *Cerastium vulgatum* (mouse-ear chickweed).

Four samples contained *Bromus secalinus* (common chess).

Three samples contained *Rumex obtusifolius* (broad-leaved dock).

Three samples contained *Anthemis Cotula* (Mayweed).

Three samples contained *Oenothera biennis* (evening primrose).

Three samples contained *Daucus Carota* (wild carrot).

Two samples contained *Digitaria linearis* (narrow-leaved panicum).

Two samples contained *Lithospermum arvense* (red root).

Two samples contained *Lolium perenne* (perennial rye grass).

Two samples contained *Portulaca oleracea* (purslane).

Two samples contained *Cichorium Intybus* (chickory).
Two samples contained *Brassica nigra* (black mustard).
Two samples contained *Cirsium arvense* (Canada thistle).
Two samples contained *Cuscuta arvensis* (dodder).
Two samples contained *Verbena urticifolia* (nettled-leaved verbena).
One sample contained *Medicago lupulina* (black medick).
One sample contained *Ranunculus bulbosus* (bulbous crowfoot).
One sample contained *Ranunculus repens* (creeping crowfoot).

NO VERY EASY WAY TO DESTROY.

The great mass of farmers and gardeners think to kill a weed by some royal easy process, such as mowing in a certain phase of the moon or a certain definite period in the year or by once or twice cultivating. After the cultivator he waits until the leaves are several inches high before making the next effort. Such persons will always have the company of a weed after its first introduction into his field or garden.

To kill countless thousands of weeds coming from seeds, cultivate the ground weekly during the growing season and do not permit the weeds to go to seed, or, if this is too costly, let the weeds have their own way except during the early growth of cultivated crops. Frequent cultivation is necessary to a first class yield.

TO KILL WEEDS IN A LAWN.

In case of weeds in a lawn, most of them may be kept in check by enriching the ground liberally, enabling the better grasses to thrive by "driving the weeds to the wall."

HOW TO DEAL WITH QUACK GRASS.

The following concerning quack grass, contains points that will apply to many other weeds.

I have long considered quack grass, *Agropyron repens,* the worst weed that vexes the tiller of the soil in Michigan. It is because it holds its own well and spreads whenever there is a chance, and chiefly because the farmer does not recognize it until it is scattered far and wide. It is carried by the plow, harrow, and cultivator from one end of the field to the other. To have a farm well seeded to this grass is a calamity to be avoided.

All that is *needed* to exterminate a field of quack grass *is the right kind of a man* who will carefully observe and study the plant, fighting with method and thoroughness.

I have killed 100 or more patches and can speak from practical results and success. *Plants of this sort cannot gain any if the green leaves are not allowed to appear. The nourishment stored in the white root stocks underground will aid the plant to send up slender leaves and if these remain, the plants gain and recruit, but if the leaves start underground and are cut off before coming to the light, these white rootstocks are drawn on again to furnish food to start more leaves and thus, in time become exhausted.* If convenient, pasture closely for a whole growing season which prevents the production of new thrifty rootstocks then, if the sod be well turned under deep, rolled and har-

rowed, much of the grass will be killed at once. Ordinarily I plow late in the fall or very early in spring, rain or shine, wet or dry, or even in June, and cultivate with a shovel-toothed cultivator every three days till the middle of June, or later if starting the work later. Rarely, if the weather be wet and hot, cultivate every two to two and a half days. Keep all green leaves from showing themselves. Do not delay to see green leaves. A harrow that does not cut off the stems below the surface of the ground is not efficient.

The worst luck I ever had in this work was in summer-fallowing a piece of quack grass during a dry year. A good deal of it remained dormant and grew the following spring.

One year I tried the application of salt on one side of the bank of a brook where cultivation was very inconvenient. The strip of grass was about four rods long and the slope about five feet. Whenever seen a little at a time two barrels of salt were freely applied for the whole growing season, and the next spring the grass started up in several places ready to continue the fight, which was abandoned on that line.

For five years I tried (on the banks of a brook, or where there were only small patches) the following scheme, with great satisfaction:

During the wet and growing part of a summer I put on tarred building paper, taking care to have it overlap and completely exclude every ray of light. Six weeks to two months is enough, possibly four to five weeks, if the weather is hot and wet.

Very likely the reader will think this method costly and will hesitate and dally along, giving the grass a good chance to extend its domain. It is not worth while to plow deep or rake out the rootstocks. It is much better to be thorough in spring during a growing time than during a drouth. I mean that it can be subdued faster in wet weather than in dry. When very dry the underground stems remain dormant. Of course, small patches can be dug over with a hoe.

Where one is neat and thorough he may prefer to take two or three years in the extermination, growing two or three crops of corn in succession.

With all the talk about the importance of sowing clean seeds, the killing of weeds by a rotation of crops, the value of plow, cultivation, harrow, mower, rake, hoe, spade, urgent appeals come from the man whose field of oats is yellow with the flowers of mustard or whose lawn is yellow with dandelions.

He seeks information regarding

THE SPRAYING WITH CHEMICALS.

In the absence of long continued and thorough experiments at this college in spraying weeds, I quote from bulletin 80, 1908, of the Experiment Station, North Dakota, where Professor H. L. Bolley began this kind of work in 1896 continuing ever since for fourteen years. After all, he "Is not over sanguine in this matter, still the proper handling of spraying machinery and proper spraying at the proper time gives splendid results in weed destruction without material injury to growing cereals, to grass of the pasture lands or to lawn grasses.

"In many places it is difficult to secure good apparatus at reasonable prices. Again, it is difficult to convince some that the cheap potato

sprayer, which has no power capacity, cannot be made to serve the purpose.

"For use in grain fields, the cart should be fitted with a pole for two or more horses. The wheels should be of low form and have wide tires, 3½ to 4 inches. For work on small farms the tank should hold at least 52 gallons.

"All parts in contact with the solution should be either wooden, brass or rubber. Even galvanized iron is readily destroyed by the solutions used to eradicate weeds.

"The spray beam should carry nozzles sufficient to throw in a forceful, misty spray from one to one and one-fourth barrels of liquid for each acre of ground. The pump should give a pressure of about 100 or more pounds per square inch, shown by a gauge attached. Many questions are involved. The abundance and the sturdiness of the crop and the weeds; the climate, the growing season; whether the weeds are growing in dense, persistent clumps, such as Canada thistles, and whether it is important to undertake to save the crop in the particular spots or not. Do not buy patent or highly advertised chemical-weed eradicators, but instead buy chemical substances on the market.

"The station has used, successfully, in various sorts of weed-eradication work, common salt, iron sulfate (copperas, green vitriol) copper sulfate. (blue stone of blue vitriol), corrosive sublimate (mercuric bichloride) and sodium arsenite ($NaAs\ O_2$). Great care should be taken in using some of these.

"This chemical method of weed eradication has the peculiar merit that the weeds may be attacked while a crop is being grown and the crops will still give an increased yield. 'Chemicals act differently upon the members of different families of plants.'

"One field sprayer, with proper help, can spray from twenty-five to forty acres per day.

"Good field sprays cost from $60 to $150. Good hand sprayers, for dandelions and patches of Canada thistles, etc., may be had at $8 to $10. Iron surfate in powdered form, ready for use in solution, was available in Grand Forks and Fargo for .90 to $1.10 per hundred pounds.

"The question as to when to spray must be settled by a number of considerations, crop conditions, the weed growth, and weather.

"Good results have been obtained in spraying oats, wheat and barley when the grain is eight to twelve inches high, to kill mustard and king head (giant ragweed). Mustard is most easily killed when it is just beginning to blossom, though iron sulfate is effective against this weed at all stages up to the forming of seeds.

"The most effective spray for Canada thistle is sodium arsenite at the rate of 1½ to 2 pounds per 52 gallons of water. The next most effective spray is common salt at the rate of one-third to one-half barrel to 52 gallons of water, in either case to be used where the thistles are in compact masses.

"In fighting the dandelion by means of chemical sprays, late experiments indicate that spraying will eventually give marked success, by using iron sulfate, spraying once a month. Plantain also gradully dies out under the spraying. For ordinary lawn purposes the ideal appa-

ratus is the compressed air type of hand spraying machine, keeping up a fine spray under high pressure, using two-pounds of iron sulfate for each gallon of water, or a weaker solution, one and one-third to one gallon of water. Do not spray until two or three days after cutting and then wait two or three days before cutting again. Spray on bright days. As seeds are blowing about a total and permanent eradication cannot be expected.

"Spraying has destroyed the following weeds; False-flax, worm-seed mustard, tumbling mustard, common mustard, shepherd's purse, pepper-grass, ball-mustard, corn cockle, chickweed, dandelion, Canada thistle, bindweed, plantain, rough pigweed, rag-weed, cocklebur.

"The writer wishes to emphasize two points: After killing most of the dandelions, do not neglect to add seeds of June grass and keep fertilizing the lawn, as dandelions seldom do harm where the grass is thick."

MICHIGAN WEEDS.

Fig. 1 (1.)

ASCOMYCETES.

Ergot. Spurred Rye. *Claviceps purpurea* (Fr.) Tul. Fungi bearing spores produced in definite number (often 8) in specialized cells, asci.

This is a poisonous fungus sometimes appearing on the grains of rye, timothy, red top and other grasses and is mentioned here because its nature is frequently misunderstood.

About fifteen of these growths are here represented as projecting from a spike of meadow foxtail and four large growths from a spike of rye. This is only the first stage of the fungus, of which there are several others not represented, appearing the following year.

GRASS FAMILY. GRAMINEAE.

There are many widely different plants which in popular language have the name "grass" attached to them, such as knot-grass, rib-grass, cotton-grass, sea-grass, eel-grass, sedge-grass, the clover and others, but these do not belong to the family here under consideration.

Grasses which are grown chiefly for the use of their grain, such as Indian corn, wheat, oats, barley, rye, rice, doura are called cereals.

Besides the cereals the family includes sugar cane, millet, bamboo, timothy, red-top, June grass, fowl meadow grass, blue joint, buffalo grass, orchard grass, meadow foxtail, the fescues, rye-grass, oat-grass, Bermuda grass, and other pasture grasses, and, as will here be seen, the family is conspicuous for a considerable number of weeds.

The grass family heads the list of food producing plants, which are the foundation of all agriculture. Of the staple crops of the United States, the grass family contributes about five-sixths of the total value. There are about 3,500 species of grasses.

Fig. 2 (2).

Quack Grass. Couch Grass. *Agropyron repens* (L.) Beauv. A mooths pale green perennial, very variable, 30-120 cm. high, with long creeping, jointed rootstocks; spikes 6-20 cm. long, erect or bent; spikelets 10-20 mm. long, 2-8-flowered, florets overlapping for three-fourths of their length or more; empty glumes each unsymmetrical, 7-11 mm. long, first strongly 5-6-nerved, second 7-8-nerved, acute or notched, margins scarious, floral glume about 1 cm. long, those above shorter, 5-nerved near the short awned apex.

Found in Europe, North Africa, Asia and extensively naturalized in cultivated grounds in North America. The rootstocks fill the soil, much resembling those of June grass, except they are larger; the flat, twisted leaf-blades near the ground are not easily distinguished from those of timothy It seldom produces seeds till the plants becomes dwarfed by crowding.

I have long considered quack grass the worst weed in Michigan because it holds its own well and spreads whenever there is a chance and chiefly because the farmer does not recognize it until it is scattered far and wide.

Fig. 3 (3.)

Wild Oat. *Avena fatua* L. This annual plant has much the appearance of the oats in cultivation, of which some consider this the parent form. The species has attached to the back of the floret a conspicuous awn, twisted and bent when dry, besides the firm floral glume is thinly clothed with stiff slender hairs, and these aid it much in distribution by adhering to the fleeces of animals and to the inside of grain sacks. Troublesome in Oregon, California, Canada and neighboring regions where cereals are extensively grown, but as yet seldom seen in Michigan. Introduced from Europe.

Fig. 4 (15).

Stink Grass. *Eragrostis megastachya* Koeler) Link. (*E. major* Host. *E. eragrostis* (L.) Karst. *E. poaeoidis* Beauv.) A spreading and much branched annual, 10-25 cm. high, the leaves bearing glands that secrete a substance very offensive to grazing animals. Panicle ovoid or linear rather dense, 5-15 cm. long; spikelets flat, lead-colored, 8-20 flowered. Sandy waste places; introduced from Europe.

(Fig 4a.)

Eragrostis hypnoides (Lam.) B. S. P. (*Eragrostis reptans* Nees.) A light green prostrate, much branched and very variable annual, extensively creeping late in the season along ditches and wet land, 5-30 cm. high; spikelets flat, 10-40 flowered, borne on open panicles. Extensively distributed in the United States, Canada, Mexico and South America. The little thing seems to have no good common name.

Fig. 5 (5).

Soft Chess. *Bromus hordeaceus* L. (*Bromus mollis* L.) This plant is becoming frequent in waste places; an annual, 10-45 cm. high. The whole plant is soft hairy. Introduced from Europe.

Field Chess. *Bromus arvensis* L. and **Smooth Brome-grass.** *Bromus racemosus* L. Mentioned in Bulletin 260, are only rarely met with in this country. They have much the appearance of the common chess of our wheat fields, excepting the spikelets are softer and the awns longer. Some authors believe these three are mere forms of the same species. All of them are natives of Europe.

Fig. 6 (7).

Chess, Cheat. *Bromus secalinus* L. Too common where it thrives with winter wheat, because like wheat, it needs to make some growth in autumn and matures in summer ready for harvesting and threshing with the wheat from which it is not easily wholly separated.

Specimens of this plant are occasionally met with in the field and harvested with red clover cut for seed. After threshing it goes with clover seed into a machine for a thorough rubbing which takes off some of the adherent inner chaff and often breaks off a little from one or both ends of the grain. Grains of chess thus mutilated are not uncommonly found mixed with clover seed and the two are sown at the same time. Introduced from Europe.

Fig. 7 (8).

Barren Brome Grass. *Bromus sterilis* L. A soft annual appearing in several places in the state, about 50 cm. high. The drooping spikelets are correctly shown at A. Introduced from Europe.

Fig. 8.

Downy Brome Grass. *Bromus tectorum* L. Stems erect, tufted, slender, 30-60 cm. high; leaves softly pubescent; panicle broad, one-sided, drooping, 6-15 cm. long; spikelets 10-20 mm. long.

Grand Rapids, Detroit, Bay County, spreading rapidly where introduced. Naturalized from Europe.

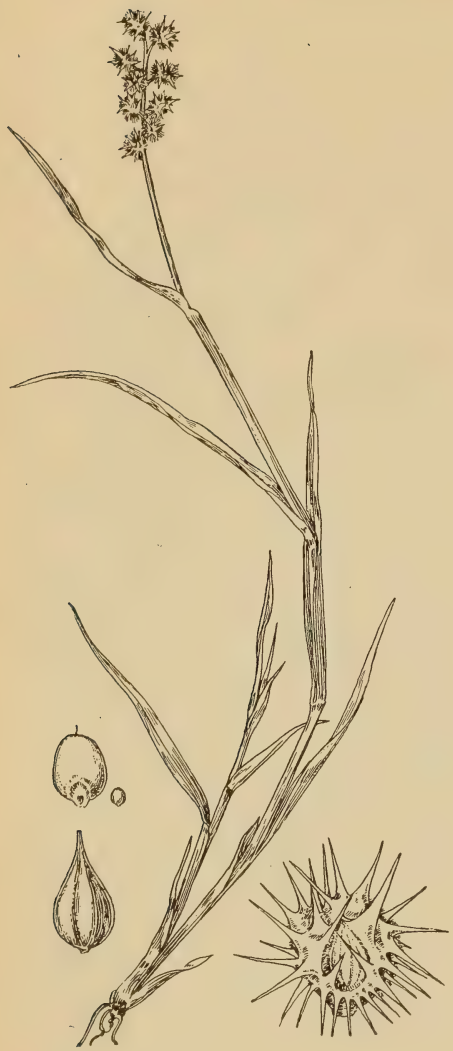


Fig. 9 (9).

Sandbur. Bur Grass. *Cenchrus tribuloides* L. Annual, with flattened spreading branches, about 30 cm. high. Each usually bearing 6-20, hard formidable burs inside of which the grains are produced.

The numerous, sharp diverging and minutely barbed prickles enable the burs to adhere to fleeces of animals and gain free transportation.

Sandy fields, borders of streams and lakes, widely distributed in North America and South America.

Fig. 10 (10).

Bermuda Grass. Scutch Grass. Dog's-tooth Grass. *Cynodon Dactylon* (L.) Pers. (*Capriola Dactylon.*) This grass-weed is a child of the sun and thrives all over hot countries, but at the same time it is a very valuable grass for pastures in the southern United States and is the very best thing to hold the fine soil on the artificial banks bordering the Mississippi.

The stems creeping on the surface and below are large, stout and wiry, making the land difficult to cultivate. In the southern states, Bermuda grass is the worst weed cotton growers have to contend with. In central Michigan the plant is killed back to the ground with the first hard frost, and during winter it is usually killed several inches below the surface. The succeeding year it starts with great deliberation, scarcely showing itself before July. Its season of about three months gives no promise of value for pasture in Michigan.

When everything is considered, I think quack-grass is one of the worst weeds that vexes the farmers of the state. In a number of places, I know Bermuda and quack grass have come in contact and both have attempted to occupy the same ground at the same time with the result that very little quack grass is left after Bermuda has once taken hold.

Fig. 11 (11).

Small Crab-grass. *Digitaria humifusa* Pers. (*Panicum lineare* Krock. *Syntherisma linearis* (Krock.) Nash.) A smooth, slender annual with stems usually prostrate, spreading, 15-35 cm. high, each stem bearing 2-6 slender one-sided spikes. Whole plant of a reddish hue, not rooting at the nodes. Common in thin lawns and pastures late in the summer. Unless crowded the stems are prostrate. Introduced from Europe.

If lawns and meadows are enriched, the better grasses and clovers will crowd this plant out.

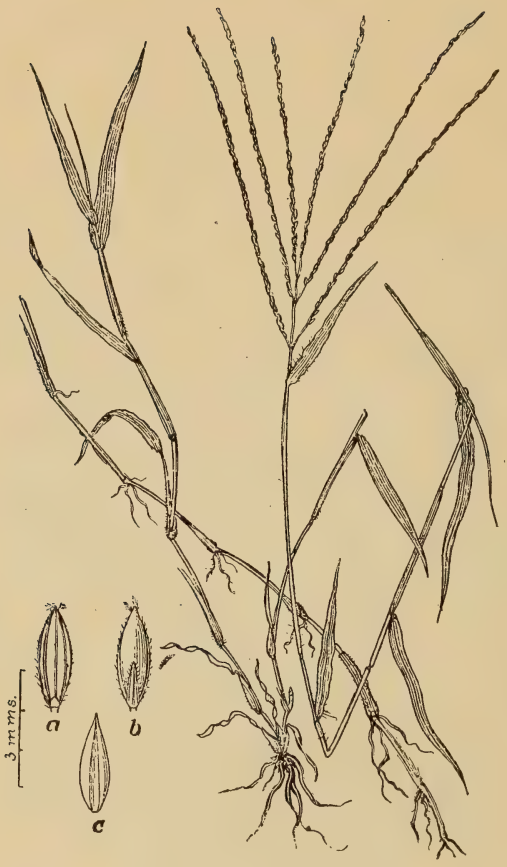


Fig. 12 (12.)

Large Crab-grass. Finger Grass. *Digitaria sanguinalis* (L.) Scop. (*Panicum sanguinale* L. *Syntherisma sanguinalis* (L.) Nash.) A spreading annual, often of a reddish hue, smooth or hairy, 30-60 cm. or more high, each stem bearing near the apex 4-15, one-sided spreading spikes, the stems usually sending out numerous tough roots at the joints. Common in gardens and often found in thin lawns and pastures. Introduced from Europe. If grass land is made rich, the better grasses and clovers will crowd this plant out or nearly so.

Fig. 13 (13).

Barnyard Grass. *Echinochloa crus-galli* (L.) Beauv. (*Panicum crus-galli* L.) A coarse, erect or spreading annual, 30-120 cm. high. Spikes dense, alternate, simple or compound, 2-8 cm. long bearing spikelets on two sides of a three-sided rachis. Very variable in size and color. Waste grounds especially where moist, flowering all summer. Throughout the warmer regions of both hemispheres.

Fig. 14 (14).

Goose or **Yard-grass.** *Eleusine indica* (L.) Gaertn. A coarse, erect or spreading annual, 15-16 cm. high, each stem bearing at the apex or near it 2-5 diverging spikes, 5-7 cm. long. Rachis flattened. More common in tropical and warm temperate regions than in Michigan.

Fig. 15 (16).

Squirrel-tail Grass. *Hordeum jubatum* L. Other common names are Skunk Grass, Wild Barley. A smooth, slender, tufted annual, biennial or perennial, 30-45 cm. high. Spikes 4-7 cm. long, rachis very slender soon breaking at each joint the lower portion of which is barbed and sharp-pointed, making a formidable weapon to pierce the gums of cattle and sheep. The spikelets are three in a cluster each with two slender awns, 4-6 cm. long. Very graceful and ornamental before the spikes break in pieces. Native of this country and widely distributed. Fortunately seldom abundant except on moist alkaline soil. It yields readily to good cultivation.

Fig. 16 (19).

Low Spear Grass. *Poa annua* L. A soft, smooth, light green annual, stems weak, compressed, 5-30 cm. high. Panicle green or purplish. This grass will produce three crops a year in central Michigan Found almost everywhere, in the vegetable garden and in a dense lawn. The enterprise of this little grass is equal to that of the English sparrow. Introduced from Europe. In shady places, where well fertilized and watered it produces a very pleasing lawn.

Fig. 17 (17).

Old-witch Grass. Tickle Grass. A Tumble-weed. *Panicum capillare* L. An erect, spreading, hairy, much-branched annual, 30-60 cm. high; bearing open panicles half the length of the entire plant. The branches very slender and rather stiff: the whole panicle when mature, breaking from the plant and carried for long distances by the wind. Native to this country.

Fig. 18 (18).

Switch Grass. *Panicum virgatum* L. The stem smooth, wiry, erect, 90-150 cm. high, usually forming large tufts, with creeping strong root-stocks, long, flat leaves and ample spreading panicles, sometimes 60 cm. long. Sandy soil, usually along lakes and streams. Extensively distributed in the United States and Mexico. Rather ornamental, seldom much of a weed in Michigan.

Fig. 19 (20).

Blue Grass. Flat-stemmed Poa. Wire Grass. Canadian Blue Grass. *Poa compressa* L. Bluish green, stems firm, smooth, much compressed, 30-60 cm. high from creeping rootstocks. Panicle usually contracted, 5-10 cm. long. Dry soil, extensively naturalized from Europe.

The "seeds" are sometimes used to adulterate those of June grass. Of the smaller details, perhaps the best single one to distinguish this grass from Kentucky blue grass is to be seen in figures of the spikelets, especially the palets.

Fig. 20 (21).

June Grass. Kentucky Blue Grass. Spear Grass. *Poa pratensis* L. A very common and variable widely distributed perennial; stems smooth, scarcely compressed, 10-120 cm. high, from copious running rootstocks; blades more or less compressed unless moist, 5-30, rarely 60-150 cm. long, the edges usually parallel, the apex very abruptly boat-shaped; panicle when open about as wide as high. Very extensively distributed in Europe, Asia, North and South America.

Our plants in cultivation introduced from Europe. This is one of our worst weeds for the garden and low moist fields in cultivation.

Fig. 21 (22).

Rye. *Secale cereale* L. An erect, glaucous fall annual, 1-2 m. high. Spikelets usually two-flowered, in a cylindrical spike, sessile, compressed, one at each joint on alternate sides of the rachis. A hardy plant, often a weed in fields of wheat. Introduced from Europe.

Fig. 22 (25).

Porcupine Grass. *Stipa spartea* Trin. A graceful, erect, tufted perennial, 50-120 cm. high. Leaves narrow, long acuminate, panicle few-flowered, 12-15 cm. long. Rather scarce in Michigan. A pernicious weed, on account of its barbed "seeds."

Fig. 23 (24).

Pigeon Grass. Green Foxtail. *Setaria viridis* (L.) Beauv. (*Chaetochloa viridis* (L.) Nash.) Stems erect, 30-60 cm. high. Sheaths not compressed, not tinged with red; blades flat, not twisted. Spike-like panicle erect, green, nearly cylindrical, 3-8 cm. long, bristles for each spikelet 1-5, often 10 mm. long, barbed upwards. Very common in cultivated fields, oftener met with in clover seed than any other weed. It much resembles small plants of Hungarian grass; naturalized from Europe.

Fig. 24 (23).

Pigeon Grass. Yellow Foxtail. *Setaria glauca* (L.) Beauv. (*Chaetochloa glauca* (L.) Scrib.) Stems erect, compressed below, 30-60 cm. high; sheaths loose, compressed, more or less tinged with red; blades flat twisted. Spike stiff, simple, cylindrical usually tawny yellow, 5-10 cm. high, awn-like branches, 6-13, barbed upwards.

A common annual weed found in cultivated ground and waste places in many regions of the world. It starts much later than our other species of pigeon grass, *S. viridis*. Introduced from Europe.

SEDGE FAMILY. CYPERACEAE.

A large family of grass-like or rush-like plants including about 3,000 species widely distributed over the world, nearly all of which are of little or no value to the farmer. Most of them thrive in marshes or on wet land. The leaves of sedges are placed one above or within the other on three sides of the stem, while the leaves on a straight stem of a grass plant are placed on two sides of the stem. Some sedges are cut and cured making hay of very poor quality, known as marsh hay.

Fig. 25 (26).

Yellow Nut Grass. *Cyperus esculentus* L. Sedges are very difficult of identification except by an expert. The cut gives a good idea of the top of a moderate sized plant, 30-70 cm. high. Perennial by rootstocks bearing tubers, one shown in the figure at b. Sometimes troublesome on low land. Remedy for the destruction of most all sedges is thorough drainage of the land.

Fig. 26 (27).

Ovoid Spike Rush. *Eleocharis ovata* (Roth.) R. & S. A slender, tufted annual, 6-40 cm. high; each stem bearing at its base several short leaf sheaths and at top a single egg-shaped spike, 2-7 mm. long. Very variable. Sometimes troublesome in wet land, as are also to some extent several other species much resembling this one, except in size and shape of the spike. Widely distributed. To get rid of it, drain the land.

RUSH FAMILY. JUNCACEAE

This is a small family containing about 200 species of grass-like and sedge-like plants widely distributed, growing in tufts in moist land. (Fig. 27.)

LILY FAMILY. LILIACEAE.

Most people have some conception of the meaning of the word lily, though they may not recognize onions as members of the family. The world over there are 1,300 species in a restricted sense or nearly 1,900 in the broader sense. Botanists are not all agreed on this point.

Some people would rank leeks found in the woods in early spring as weeds, because they taint milk from which butter is made, though a few people like leeky butter. (Fig. 28.)

Fig. 27 (28).

Slender Rush. *Juncus tenuis* Willd. A small plant, 15-40 cm. high; stem wiry; the lower leaves about half as high as the stem; some of the upper leaves projecting above the flowers.

In dry or moist soil, especially along roads and paths, now spreading extensively in many regions. Seldom recognized.

Fig. 28 (29).

Field Garlic. Wild Garlic. Wild Onion. *Allium vineale* L. Like some other species this one not only produces bulbs in the ground, but in place of flowers at the top it has acquired the habit of producing bulblets more or less. The hollow stems are slender, a few in a bunch, 30-90 cm. high. Field garlic is slowly extending its domain into grass land and fields of wheat and is killed with much difficulty. The bulblets are about the size of kernels of wheat, and on this account are sometimes sown with seed wheat or ground in with the flour.

NETTLE FAMILY. URTICACEAE.

There are about 475 species of nettles and nearly related plants of wide distribution, mostly insignificant in appearance and economic value; all of them herbs, or, as some join the elms and mulberries with the nettles, the family then contains about 1,550 species.

Fig. 29.

Stinging Nettle. Great Nettle. *Urtica dioica* L. A rather stout, vigorous, stinging perennial, 60-90 cm. high; leaves ovate, heart-shaped, apex acuminate; flower clusters large, much branched, mostly dioecious. Waste places. Lansing, Bay City, Manistee. Introduced from Europe.

Fig. 30 (30).

Slender Nettle. *Urtica gracilis* Ait. A slender perennial, sparingly branched, 30-180 cm. high, armed with stinging hairs; leaves narrow, 5-10 cm. long. Moist soil, common.

BUCKWHEAT FAMILY. POLYGONACEAE.

Mostly herbs with entire leaves and stipules in the form of sheaths extending around the stem; flowers with a calyx more or less persistent; ovary one-celled, becoming an achene in fruit, flattened or 3-4- angled. Among its 800 species the family contains few of economic importance, but is rather conspicuous for the weeds it affords. Here are sorrels, docks, knotweeds, smartweeds and others.

Fig. 31 (31).

Knot-grass. Door-weed. *Polygonum aviculare* L. A slender, prostrate or erect annual (perennial farther south), dull or bluish green in color, usually less than 30 cm. high; leaves small; flowers small, inconspicuous; fruit a triangular achene, dull, minutely granular and striate. Common along paths and about door yards. Native to this country, Europe and Asia.

Fig. 32 (32).

Wild Buckwheat. Black Bindweed. *Polygonum Convolvulus* L. An annual, twining or trailing vine, 10-90 cm. or more long; leaves heart-shaped or halberd-shaped, pointed; flowers greenish in slender, interrupted racemes; fruit three-angled, dull, black; in cultivated annual crops. Introduced from Europe.

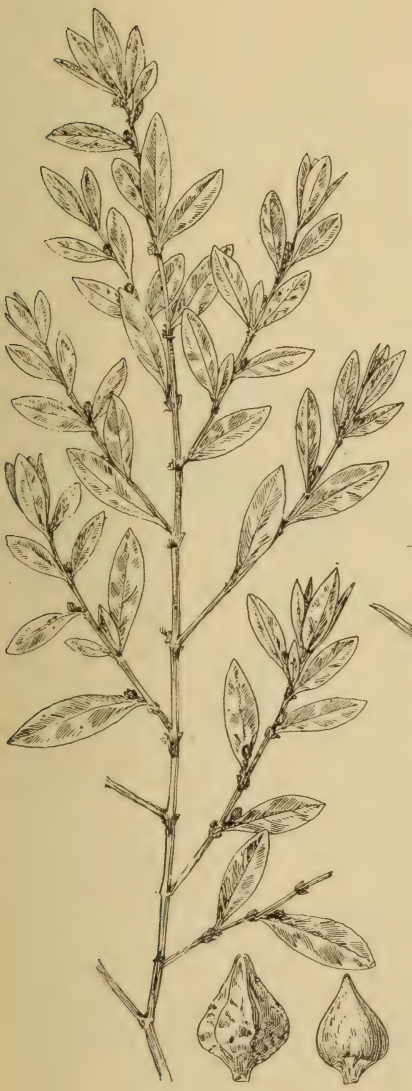


Fig. 33 (33).

Erect Knotweed. *Polygonum erectum* L. Annual, smooth, stem erect, usually simple; leaves oval, obtuse, 13-60 mm. long; flowers yellowish-green.

When compared with *P. aviculare*, it is taller with larger leaves and larger fruit. Seldom a weed of any importance; native of this country.

Fig. 34 (34).

Smart-weed. *Polygonum Hydropiper* L. A smooth, reddish, peppery, erect or spreading annual, 30-60 cm. high; leaves narrow, 2-8 cm. long; spikes nodding, interrupted, as long as the leaves; flowers mostly greenish; achene 2-3-sided, dull, granular. Wet land; introduced from Europe into this section; possibly indigenous in the northwest.

Fig. 35 (36).

Pennsylvania Persicaria. *Polygonum pennsylvanicum* L. Annual, smooth below, erect, simple or branched, 30-90 cm. high; peduncles and pedicels glandular; leaves lanceolate; racemes 2-4 cm. long; flowers bright rose-color; achenes flattened, nearly circular, jet black, about 3 mm. long. Moist soil; native to this country, Canada and the eastern United States.

Fig. 36 (35).

Pale Persicaria *Polygonum lapathifolium* L. Annual, smooth, the pedicels glandular, branching, 60-240 cm. high; leaves lanceolate, 4-20 cm. long; spikes slender, rather dense, drooping, 1-5 cm. long, achenes flattened, shining; wet places, common, very variable, throughout temperate North America. Introduced from Europe.

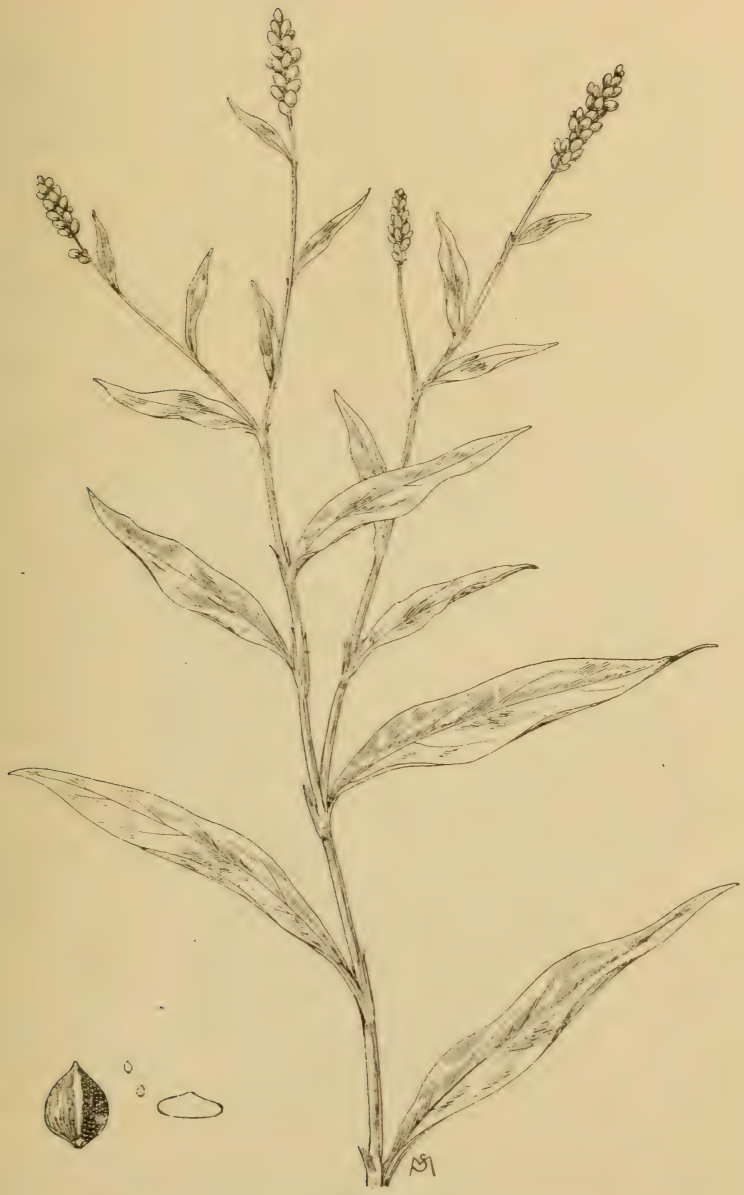


Fig. 37 (37).

Lady's Thumb. *Polygonum Persicaria* L. Annual, usually smooth, much branched unless crowded, 15-60 cm. high; leaves lanceolate, roughish, often marked by a dark triangular or moon-shaped spot near the middle, giving rise to the common name; racemes dense, 2-3 cm. long; calyx pink to dark purple; achenes smooth, shining, usually flattened, 2-3 mm. long. Fields and waste places very common. Introduced from Europe and widely distributed.

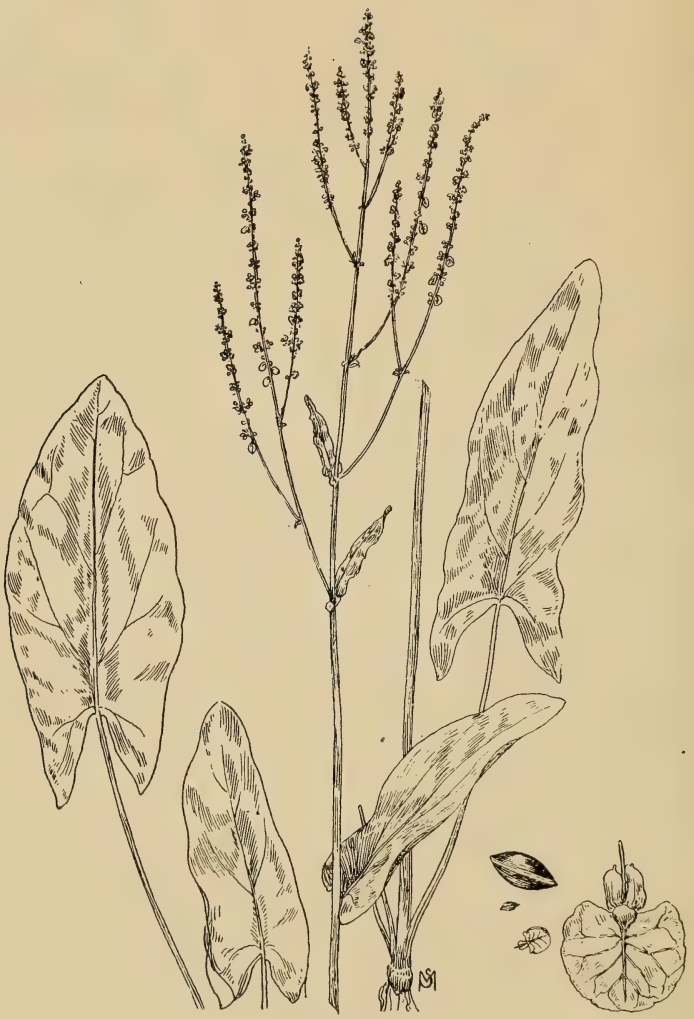


Fig. 38 (29).

Tall Sorrel. Sour Dock. *Rumex Acetosa* L. An erect, sour, smooth, dioecious perennial, 30-90 cm. high; spreading by rootstocks, leaves oblong, arrow-shaped, 2-10 cm. long; racemes erect, crowded or interrupted, calyx green, winged in fruit, orbicular, heart-shaped, 3.5-4.5 mm. long. Sparingly naturalized from Europe.

Fig. 39 (40).

Sheep Sorrel. Red-topped Sorrel. Field Sorrel. *Rumex Acetosella* L. An erect, sour, dioecious annual or perennial, spreading by running rootstocks, 10-30 cm. high; leaves mostly narrowly hastate, usually widest above the middle; flowers in erect, interrupted racemes.

Widely distributed throughout most of North America. Mostly introduced from Europe. In many places a common weed, though it is very scarce in cultivated land of the college farm.

Fig. 40 (41).

Narrow-leaved Dock. Curled Dock. *Rumex crispus* L. Perennial with a deep tap root smooth, rather slender, erect, 90-160 cm. high; leaf-blades cordate, lanceolate, acute, with wavy-curled margins; panicle rather open; flowers rather loosely whorled, valves circular, heart-shaped, nearly entire, 2.5-3.5 mm. long, each bearing a tubercle. Very common and well known as a bad weed. Introduced from Europe. Not difficult to manage with a good rotation of crops. When it appears in a meadow, wait till the stem runs up and gets some strength, before seeding. When the ground is soft, thrust a spade erect near the plant, prying with spade and pulling with the other hand and out comes all the main root.

Fig. 41 (44).

Willow-leaved Dock. *Rumex mexicanus* Meisn. (*R. salicifolius.*) A smooth, light green, erect, perennial, 30-90 cm. high, with a strong tap root; leaves linear-lanceolate; panicle very dense; calyx deltoid-ovoid; about 3 mm. long; tubercles three, large; achene dark red, shining. Native of North Eastern North America. Widely distributed, not yet common in Michigan.

Fig. 42 (42).

Broad-leaved or **Bitter Dock.** *Rumex obtusifolia* L. A smooth perennial, with a deep tap root; stem simple, stout, erect, 60-120 high; lower leaves heart-shaped, oblong-lanceolate, the upper narrower, the margins only slightly wavy; flowers loosely whorled, valves (part of calyx) ovate-hastate, with some teeth on the sides near the base, the larger tubercle ovoid-elliptical, the other two rudimentary; achene dark red, smooth, shining. Fields and roadsides, less common than *R. crispus.* Introduced from Europe and widely distributed.

Fig. 43 (43).

Patience Dock. *Rumex patientia* L. A tall, erect, perennial from a stout tap root, 60-150 cm. high; lower leaves ovate-lanceolate, long-petioled, 80-30 cm. long, the upper narrower; panicle dense, whorled; wings cordate, nearly entire, 4-9 mm. long, one tubercle, 2-3 mm. long, ovoid, the other two wanting or rudimentary. Becoming common; naturalized from Europe.

GOOSEFOOT OR PIGWEED FAMILY. CHENOPODIACEAE.

Chiefly annual herbs, of weedy aspect so far as this country is concerned; flowers very inconspicuous, each pistil bearing a single seed. Economic plants are spinach and beets. A small family of 550 species widely distributed.

Fig. 44 (45).

Spreading Orache. *Atriplex patula* L. A dark green, spreading annual 30-120 cm. high; leaves petioled, the blades narrowly lanceolate-hastate, 2-10 cm. long, sparingly toothed or three-lobed below; flower clusters in rather slender spikes, the two kinds together or separate. Naturalized from Europe. Not common nor troublesome.

Fig. 45.

Halberd-leaved Orache. *Atriplex patula hastata* (L.) Gray. A pale green or purplish, scurfy annual, 30-70 cm. high; leaves with slender stems, the blades of the lower broadly triangular-hastate, entire or sparingly toothed; very variable. Salt meadows and waste places along the Great Lakes. Not very troublesome.

Fig. 46.

Russian Pigweed. *Axyris amarantoides* L. A coarse, erect, branching, very leafy annual, 60-120 cm. high, clothed with short, star-shaped hairs, turning white with maturity.

Not yet known in Michigan but should be diligently looked for. Found near Winnipeg, Canada, as imported from Russia and is spreading rapidly.

Fig. 47 (46).

Pigweed. Lamb's Quarters. *Chenopodium album* L. Annual, pale green, branching much, 30-300 cm. high; leaves varying from rhombic-ovate to lanceolate, the lower more or less sinuate-lobed or toothed; flower clusters dense, simple or compound. Introduced from Europe and widely distributed in North America. One of our commonest weeds everywhere in annual crops. A variety, *viride* is bright green, less mealy and has less dense inflorescence, found with the above.

Fig. 48 (47).

Mexican Tea. *Chenopodium ambrosioides* L. A smooth or slightly glandular, not mealy, strong-scented, leafy annual, 60-90 cm. high; leaves with short stems, oblong-lanceolate, entire or wavy-toothed, spikes leafy, densely flowered. Naturalized from tropical America and widely distributed. Not prominent in Michigan.

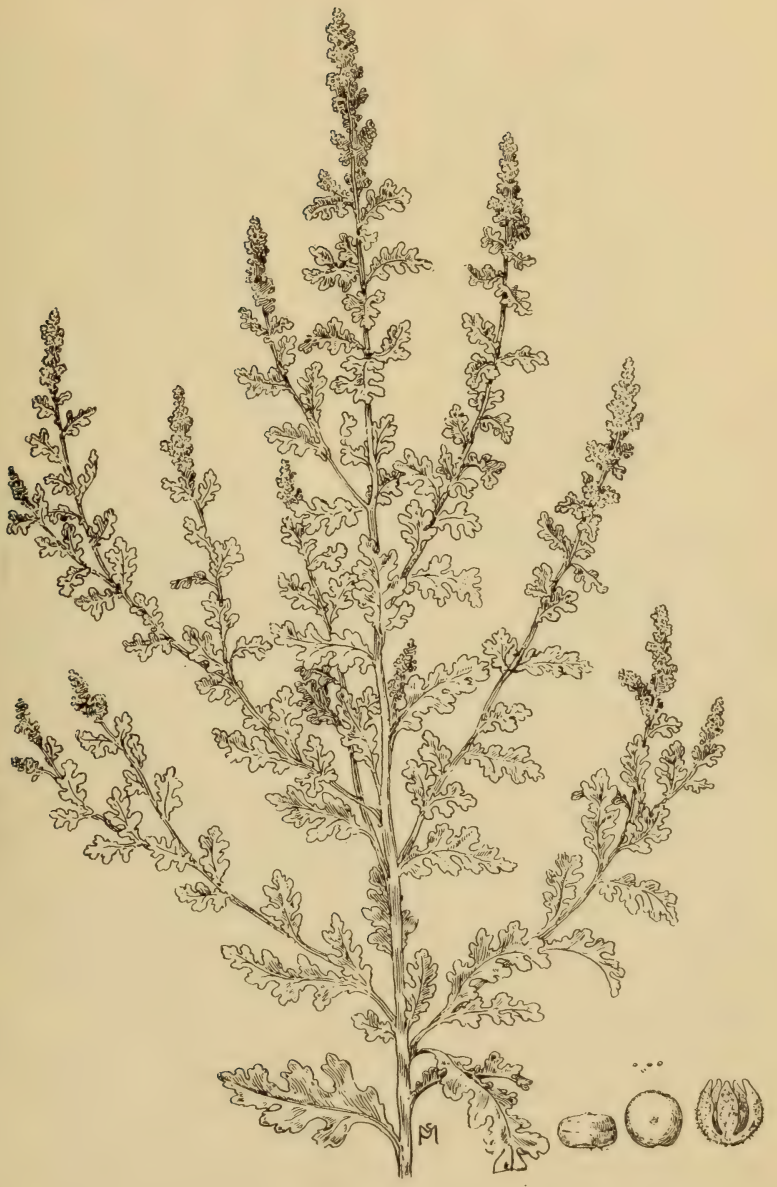


Fig. 49 (48).

Jerusalem Oak. *Chenopodium Botrys* L. Annual, glandular, pubescent, viscid, strong-scented, 20-60 cm. high; leaves oblong, pinnatifid, 2-4 cm. long; racemes cyme-like, loose, leafless; flowers very small. Waste places, extensively spread, coming from Europe; not prominent in Michigan.

Fig. 50 (49).

Oak-leaved Goosefoot. *Chenopodium glaucum* L. Annual, spreading, 8-30 cm. high; leaves pale green above, white-mealy below, mostly oblong, sinuate-dentate, 24 cm. long; spikes small axillary. Often found in waste places over much of the globe, coming to this country from Europe.

Fig. 51 (50).

Maple-leaved Goosefoot. *Chenopodium hybridum* L. Annual, bright green, not mealy, 30-120 or more high; leaves thin, cordate, often ovate-rhombic, the lower, 8-15 cm. long, taper pointed, 1-4 large teeth on each side; racemes loosely panicled, leafless. Native to North America and Europe. Not a prominent weed in Michigan.

Fig. 52.

Nettle-leaved Goosefoot. *Chenopodium murale* L. Annual, scarcely mealy, loose, branched, 30-60 cm. high; leaves bright green with petioles, blades rhombic-ovate, coarsely and sharply toothed, 4-8 cm. long; spikes in loose axillary panicles. Widely distributed, coming from Europe. Not prominent in this state.

Fig. 53 (51).

Many-seeded Goosefoot. *Chenopodium polyspermum* L. Annual, not mealy, usually much-branched, 15-90 cm. high; leaves petioled, entire, mostly oblong, 2-6 cm. long; slender panicles abundant, calyx not completely covering the seed. Sparingly naturalized from Europe. Scarce in Michigan.

Fig. 54.

Upright Goosefoot. *Chenopodium urbicum* L. A dull green annual, scarcely mealy, 30-90 cm. high; leaves triangular, or narrowed at the base coarsely toothed, the larger, 6-10, cm. long; spikes erect, crowded in a long panicle. Naturalized from Europe. Not abundant. Waste grounds. Lansing, Ionia, Flint, Grand Rapids, Ann Arbor.

Fig. 55 (52).

Winged Pigweed. *Cycloloma atriplicifolium* (Spreng.) Coulter. A densely bushy-branched, pale green annual becoming purple, a tumbleweed, 10-40 cm. high; leaves petioled, blades lanceolate, sinuate-toothed, 2-6 cm. long; panicles loosely flowered. Occasional, coming from the west. Lansing, Port Huron, Manistee, Keweenaw County. May be expected wherever Russian thistles grow, as both follow railways, ballast of ships, and both are tumbleweeds.

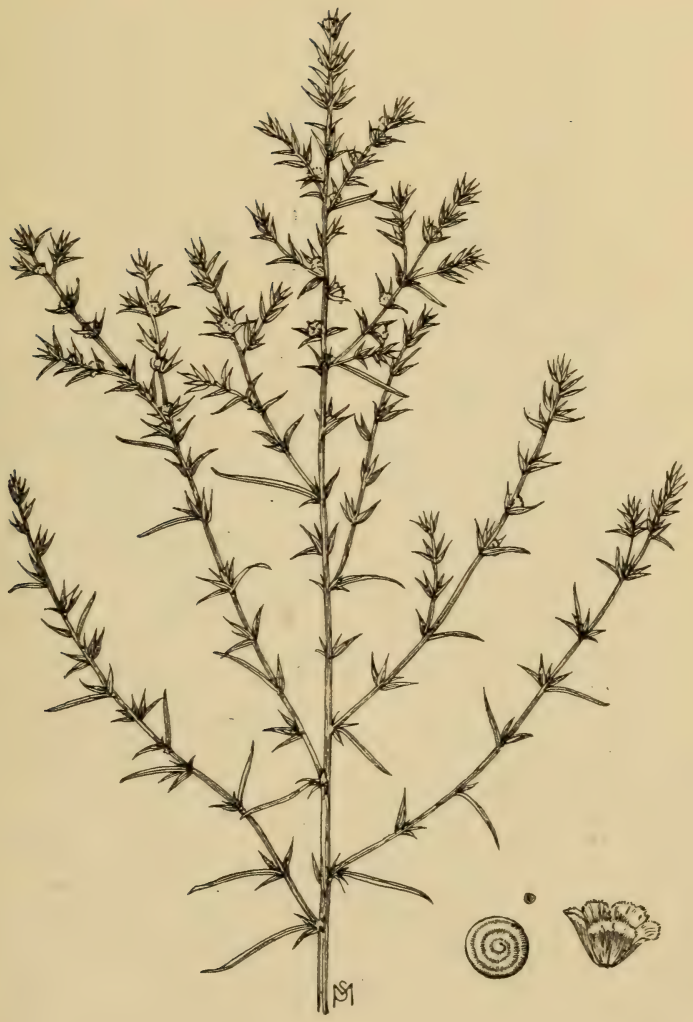


Fig. 56 (53).

Russian Thistle. *Salsola Kali tenuifolia* G. F. W. Mey. (*Salsola Tragus* L.) A dense bushy arinual, 30-90 cm. high, a tumbleweed; young plants soft, succulent, bearing cylindrical leaves, 3-7 cm. long, relished by sheep; leaves of older plants awl-shaped, prickly-pointed; the whole plant streaked and splashed with bright red when mature. Especially troublesome in spring wheat and other annual crops. Introduced into the Northwestern States from Russia, and from there spread eastward carried by railway trains and mixed with seeds of alfalfa and red clover.

THE PRICKLY PIGWEEDS. AMARANTH FAMILY. AMARANTHACEAE.

Weedy herbs; flowers greenish-white, minute, surrounded by prickly bracts or scales, often colored. A small family including about 425 species, mostly growing in tropical regions.

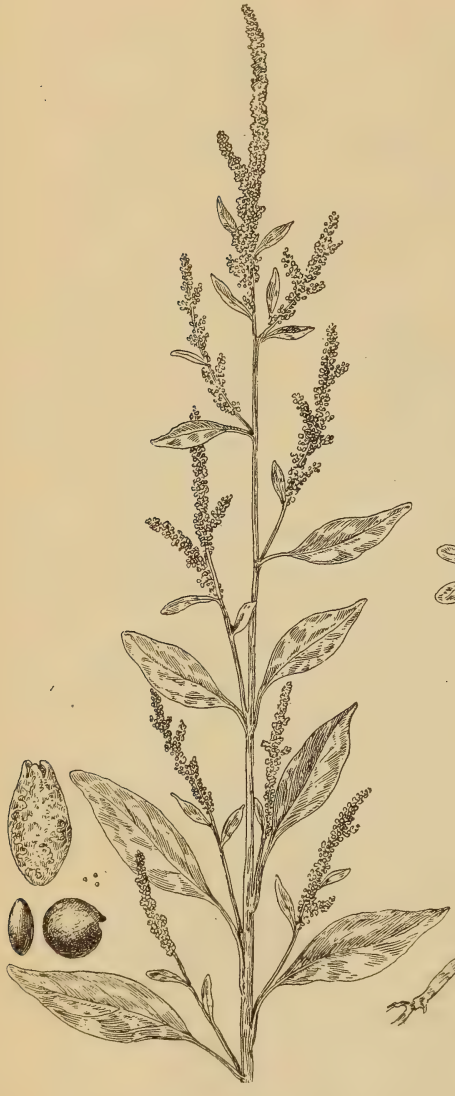


Fig. 57 (54).

Western Water Hemp. *Acnida tuberculata* Moq. An erect, slender, dioecious annual, 30-90 cm. high; leaves lanceolate or rhombic-ovate, usually acute, 4-12 cm. long; spikes mostly loose or interrupted; flowers surrounded by soft prickly bracts. Frequent along the Grand River Valley. Native to this country.

Some plants of this species are prostrate but seeds of the prostrate do not all of them produce prostrate forms.

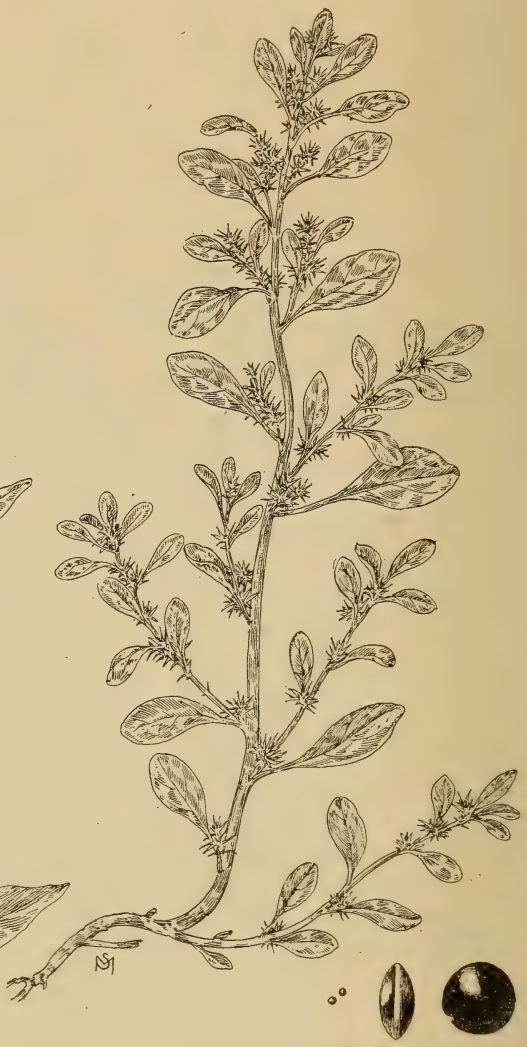


Fig. 58 (55).

Prostrate Amaranth. *Amaranthus blitoides* S. Wats. A smooth, pale green, much-branched, prostrate annual, 12-60 cm. or more long; leaves obovate or spatulate, 0.5-2 cm. long. In waste places, especially along railroads. Naturalized from the west.

Fig. 59 (56).

Tumble Weed. *Amaranthus graecizans* L. (*A. albus* L.) A smooth, pale green, bushy, branched annual, 30-60 cm. high; leaves oblong or spatulate, 0.5-1.5 cm. long; bracts awlshaped. Naturalized from tropical America, and widely distributed in North America. Sandy and gravelly, well drained soil, becoming when mature a model tumble weed.

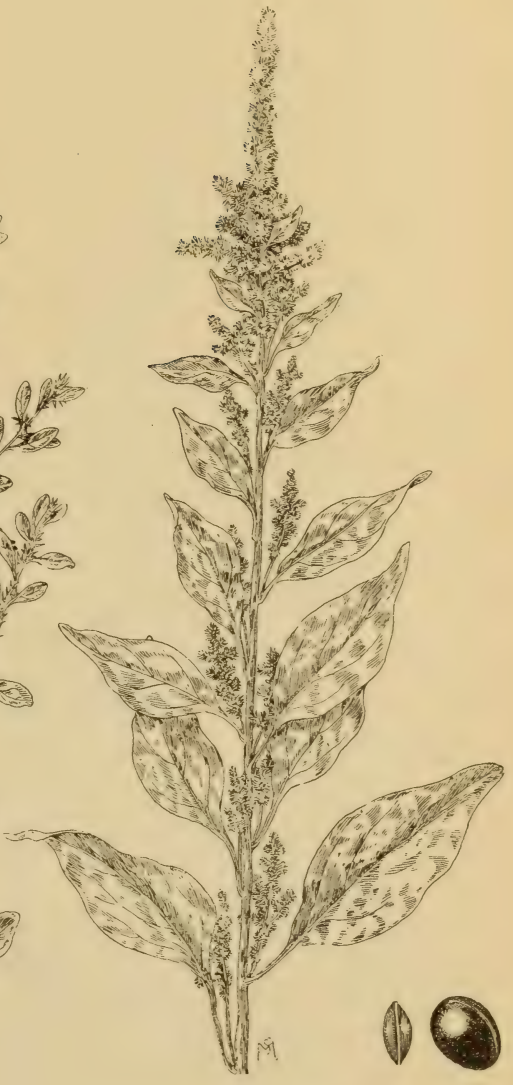


Fig. 60 (57).

Green Amaranthus. Rough Pigweed. *Amaranthus hybridus* L. (*A. chlorostachys* Willd.) Usually slender, erect, dark green, nearly smooth, annual, 60-240 cm. high; leaves bright green both sides; spikes slender-cylindrical, bracts rather long. Cultivated grounds. Common east, but scarce in Michigan. Introduced from tropical America.

Fig. 61 (58).

Rough Pigweed. Red-root Pigweed. *Amaranthus retroflexus* L. Rough and more or less pubescent, rather light green, leaves long petioled, ovate or rhombic-ovate, wavy margined; spikes thick, crowded, stiff. Much like the foregoing species; the prevailing one in Michigan. Very common in annual crops of corn, beets, beans, potatoes. Introduced from tropical America.

Fig. 62.

Spiny Amaranth. *Amaranthus spinosus* L. A smooth, bushy-branched annual, 30-100 cm. high, considerably resembling *A. retroflexus*; leaves rhombic-ovate, dull green, differing from others described in having a pair of stiff spines at the base of each leaf. Common south, but rare in Michigan. Introduced from tropical America.

POKEWEED FAMILY. PHYTOLACCACEAE.

A single weedy plant, is native to the northern states. The small family contains about 85 species mostly native in the Tropics.

Fig. 63.

Pokeweed. Scokeroot. Pigeon Berry. *Phytolacca decandra* L. A tall, erect, smooth perennial, 1-1.5 m. high, tinged with red late in the season, roots large, fleshy, poisonous; leaves petiolate, oblong-lanceolate, acute at both ends; flowers in thin racemes, 4-16 cm. long; the berries dark purple, much liked by birds. Naturalized in Europe. Young shoots sometimes eaten like asparagus.

FOUR O'CLOCK FAMILY. NYCTAGINACEAE.

Mostly herbs, with simple, opposite, entire leaves and regular flowers; ovary enclosed in the base of a hardened calyx.

About 250 species of wide range, only two have been introduced into Michigan, besides the four o'clock sometimes cultivated.

Fig. 64.

Heart-leaved Umbrella Wort. *Oxybaphus nyctagineus* (Michx.) Sweet. (*Allionia nyctaginea* Michx.) Perennial from a stout tap root, nearly smooth; stem angled, repeatedly forked, 30-150 cm. high; leaves broadly ovate, heart-shaped, 4-8 cm. long; involucre next the flowers more or less persistent to aid in distributing seeds; sepals red. Introduced from the south and west.

Found at Richmond, Oakland county and at the Agricultural College.

Mentioned here because in the Botanic Garden, it behaves much like narrow-leaved dock, and is likely to become troublesome.

Fig. 65.

Hairy Umbrella-wort. *Oxybaphus hirsutus* Pursh, has been found at Grand Rapids. It differs from the preceding in being glandular-hirsute, leaves sessile, lanceolate, narrowed at the base, considerably resembling the preceding.

KNOTWEED FAMILY. ILLECEBRACEAE.

The plants of this small family much resemble those of the Pink family, and by many authors are placed in that family.

Fig. 66 (59).

Knawel. *Scleranthus annuus* L. A homely, light colored, much branched, little weed, 4-12 cm. high; leaves awl-shaped; flowers obtuse, seed held by the hard persistent calyx; having the appearance of a dry-ground chickweed.

Naturalized at the Agricultural College and at Ann Arbor. Introduced from Europe.

CARPET-WEED FAMILY. AIZOACEAE.

Mostly herbs, prostrate and branching, differing from purslane and the chickweeds by having the ovary two-several-celled, stamens and petals sometimes numerous. About 500 species, mostly of warm regions, only one having reached Michigan.

Fig. 67 (60).

Carpet-weed. Indian Chickweed. *Mollugo verticillata* L. A smooth, prostrate, much-branched annual, forming mats; leaves in whorls, spatulate. Introduced from farther south. Sandy fields and roadsides in the central and southern regions of the state.

PINK FAMILY. CARYOPHYLLACEAE.

This rather large family of herbaceous plants includes such a variety that it is difficult to define to any except botanists. It contains many sorts of pinks and carnations, and is one of the families abounding in weeds.

There are about 1,500 species, most abundant in the northern hemisphere, especially in Europe.

Fig. 68 (61).

Cockle. Corn Cockle. *Agrostemma Githago* L. A tall, silky, erect, fall annual; 30-90 cm. high; flowers large, red or pink, scarcely a weed except in fields of wheat; seed black, poisonous. Introduced from Europe.

Fig. 69 (62).

Thyme-leaved Sandwort. *Arenaria serpyllifolia* L. A light-colored annual, slender, much branched and spreading, roughish, 5-15 cm. high; leaf stems short, blades ovate, acute, 4-8 mm. long; flowers small, white, numerous. Sandy soil. Introduced from Europe.

Fig. 70 (63).

Larger Mouse-ear Chickweed. *Cerastium vulgatum* L. Annual or biennial, clammy-hairy, tufted, spreading, 15-40 cm. high; leaves mostly oblong, 12-20 mm. long; flowers small, white in loose compound cymes. Fields and gardens common. Introduced from Europe.

Cerastium arvense L. and its variety *oblongifolium*, also *C. viscosum* and perhaps other species are occasionally met with, but, as yet, they are of little importance.

Fig. 71.

White Campion. *Lychnis alba* Mill. (*L. vespertina* Sibth.) Biennial, loosely branching, glandular, hairy, 30-60 cm. high; leaves ovate to ovate-oblong, acute 2-6 cm. long; flowers few in loose panicles, white or pinkish, opening toward night, often dioecious; calyx tubular, enlarging in fruit; petals obovate, two-cleft, each with a ligule at the base of the blade.

Becoming common in the lower peninsula. Naturalized from Europe.

Fig. 72 (64).

Soapwort. Bouncing Bet. *Saponaria officinalis* L. Perennial, smooth, stout, sparingly branched, leafy, 30-50 cm. high; leaves opposite, ovate or oval, 3-5-ribbed, acute, 4-6 cm. long; flowers, pink or white in dense terminal cluster, sometimes double, calyx tubular, corolla about 2 cm. broad, petals obcordate, with a scale at the base of the blade; the mucilaginous juice forming a lather with water. Spreading from root stocks, common along roadsides and in waste places, especially in sandy land. Introduced from Europe.

Fig. 73 (65).

Cow-herb. *Saponaria Vaccaria* L. (*Vaccaria Vaccaria* (L.) Britton.) Annual, smooth, erect, sparingly branched, 30-80 cm. high; leaves sessile, opposite, ovate-lanceolate, 2-6 cm. long; flowers pale red, 30-40 mm. broad; fruit enlarged, five-ribbed. Occasionally a weed in fields of grain. Introduced from Europe.

Fig. 74 (66).

Sleepy Catch-Fly. *Silene antirrhina* L. A slender, erect, slightly-branched annual, 20-90 cm. high, when in flower glutinous along two of the upper internodes. Leaves linear or lanceolate, narrowed into a petiole; inflorescence, a loose, cymose panicle; flowers small, pink, petals obcordate with minute teeth at the base of the blade.

Native of this country. Poor sandy soil perhaps introduced with Timothy seed.

Fig. 75 (67).

Forked Catch-fly. *Silene dichotoma* Ehrh. Annual, erect, pubescent, 30-60 cm. high; leaves narrow; flowers white or pink, sessile or nearly so, in forked, one-sided spikes; calyx-ribs 5, hirsute.

Introduced with clover seed into several regions of the state and likely to be troublesome. It comes originally from Europe.

Fig. 76 (68).

Bladder Campion *Silene latifolia* (Mill.) Britten and Rendle. (*S. vulgaris* (Moench) Garcke, *S. Cucubalus* Wibel. *S. inflata* J. E. Smith.) A smooth, glaucous, spreading perennial, 10-20 cm. high; leaves opposite, ovate-lanceolate, variable in size; calyx globular, much inflated, petals two-cleft, white, 12-20 mm. broad.

Naturalized from Europe and becoming common in the state.

Fig. 77 (69).

Night-flowering Catch-fly. *Silene noctiflora* L. An erect, glandular, pubescent annual or biennial, 30-90 cm. high; lower leaves large and spatulate, the upper lanceolate, flowers in loose cymose panicles, fragrant, opening at night; calyx tubular, ten-nerved, enlarging in fruit; flowers few, petals two-parted, white or pinkish.

Common, seeds difficult to separate from clover seed. Introduced from Europe.

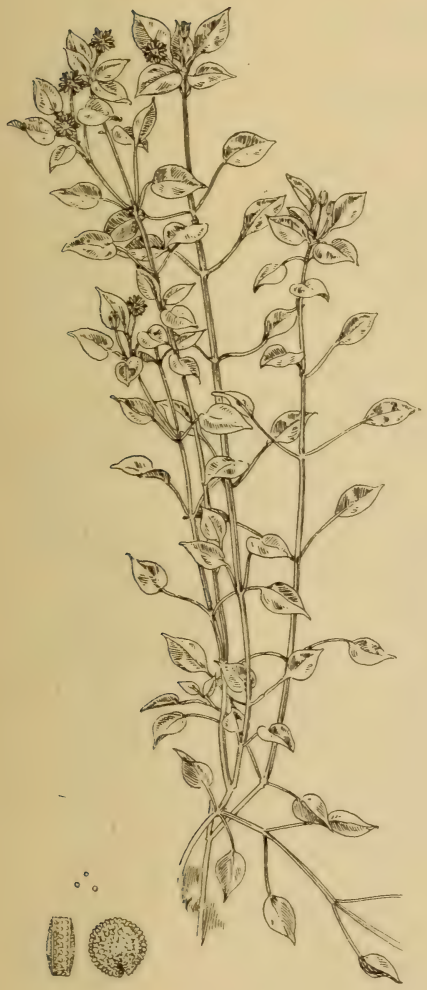


Fig. 78 (71).

Common Chickweed. *Stellaria media* (L.) Cyrill. (*Alsine media* L.) A weak, much-branched annual, 8-16 cm. high, smooth except hairs in lines on stem and petioles; leaves ovate or oval, the upper sessile; flowers in leafy cymes or solitary; petals white, two-parted. Introduced from Europe. Very common, especially abundant in spring and autumn when the weather is cool.

Fig. 79 (70).

Spurry. *Spergula arvensis* **L.** A bright green annual, 20-40 cm. high; leaves stipulate in whorls, thread-shaped, 2-5 cm. long; flowers white in terminal cymes.

Grain fields and waste places, especially in sandy land where some attempts were made to cultivate it in the northern portion of the lower peninsula. Naturalized from Europe.

PURSLANE FAMILY. PORTULACACEAE.

This small family of about 150 species consists of insipid herbs, mostly succulent and natives of America, of which one is a prominent well-known weed in Michigan.

Fig. 80 (72).

Purselane. Pussley. *Portulaca oleracea* L. Smooth, prostrate, spreading, succulent, extending in each direction, 10-30 cm.; leaves thick, alternate, clustered at the ends of the branches, obovate, 6-20 mm. long; flowers yellow, opening in sunshine for a short time in the morning. Native in the southwest. Introduced into the warmer portions of Europe.

CROWFOOT FAMILY. RANUNCULACEAE.

Mostly herbs of greatly diversified forms pervaded by acrid juice, a few woody vines; parts of the flower free and distinct from each other; some poisonous and used for medicine; in the north temperate zone a considerable number blossom in early spring, such as hepatica, anemone, butter cup, columbine, marsh marigold, globe flower, hellebore, rue anemone. About 1,050 species widely distributed, but few in tropical regions.

Fig. 81 (71).

Tall Buttercup or Crowfoot. *Ranunculus acris* L. Erect, hairy, perennial, 60-90 cm. high; leaves three-divided, each division three-cleft; petals yellow, shining. Fields and moist meadows and waste places, becoming common. Introduced from Europe.

Fig. 82 (75.)

Bulbous Buttercup. *Ranunculus bulbosus* L. Erect, hairy, perennial, 30 cm. high, from a bulb-like base; lower leaves three-divided, each three-parted, three-cleft and toothed; flowers shining, bright yellow, about 2 cm. broad. Very common in meadows in New England, slowly spreading in Michigan.

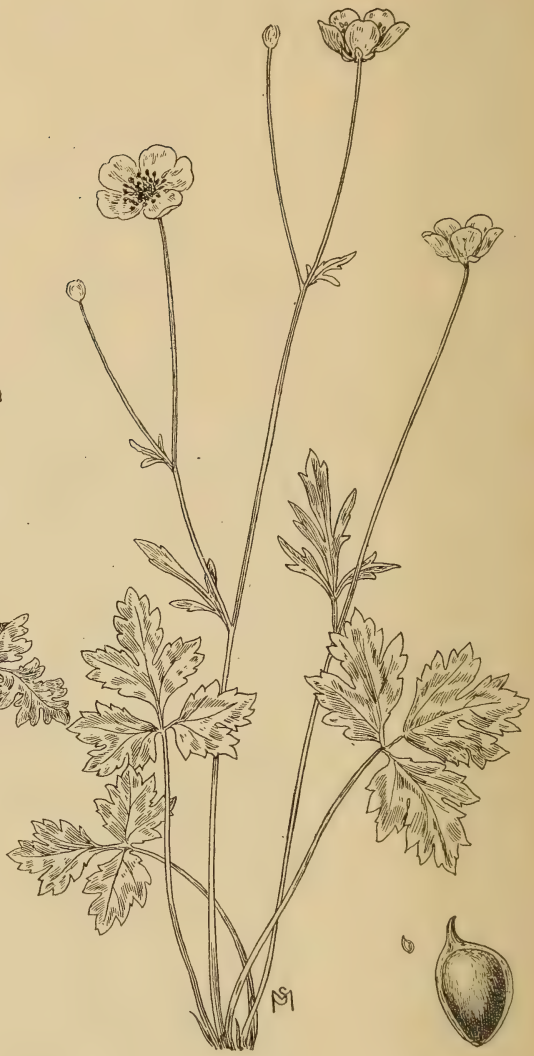


Fig. 83 (76).

Creeping Buttercup. *Ranunculus repens* L. Usually hairy, perennial, spreading by the rooting branches encroaching on grasses in meadows or lawns; leaves three-divided and variously cleft; flowers yellow, 2-2.6 cm. broad; seldom fruiting or fruiting sparingly. Introduced from Europe, perhaps indigenous in the west.

POPPY FAMILY. PAPAVERACEAE.

Herbs with milky or colored juice including poppies, bloodroot, celandine. A very small family widely dispersed in north temperate regions.

Fig. 84 (77).

Celandine. *Chelidonium majus* L. Perennial herbs, with saffron-colored acrid juice, 30-60 cm. high leaves variously divided and cut-lo bed; flowers small, yellow, often double; fruit linear-cylindric, opening by two valves, 2-5 cm. long.
Naturalized from Europe.

Fig. 85.

Poppy. *Papaver Rhoeas* L. Becomes a weed in some places, but is not difficult to subdue. The same may be said of *Papaver dubium* L.

MUSTARD FAMILY. CRUCIFERAE.

Herbs with a pungent acrid juice (horse radish), sepals 4, petals usually 4, the upper portion spreading in the form of a cross; stamens usually six, four longer than the other two, pod usually two-celled by a very thin vertical partition. Seeds of many species become mucilaginous when soaked in water. There are about 1,500 species, most abundant in temperate regions. The family is easily recognized, but the species are difficult to determine.

Useful plants of the family are the cabbage, cauliflower, turnip, ruta baga, radish, rape, sweet alyssum, stock and a few others. Weeds in this family are abundant and aggressive, new ones arriving one or more each year. It ranks as one of the prominent weed-families. None is poisonous.

Fig. 86 (78).

Yellow or Small Alyssum. *Alyssum alyssoides* L. A small annual, 10-25 cm. high, appearing gray owing to immense numbers of star-shaped hairs on the surface; leaves mostly spatulate, entire; flowers yellow; fruit flat, nearly circular. Seldom prominent as a weed.

Fig. 87 (79).

Yellow Rocket. Winter Cress. *Barbarea vulgaris* R. Br. (*Barbarea Barbarea* (L.) Mac. M.) A smooth, erect, perennial, 30-60 cm. high; lower leaves with petioles, the blade lyrate-pinnatifid; flowers bright yellow, abundant; pod obscurely four-angled. Introduced from Europe. Rather frequent along ditches and low land. Often sent in for name, but so far not aggressive.

Fig. 88 (80).

Hoary Alyssum. *Berteroa incana* (L.) DC. A pale green, diffuse annual, 30-60 cm. high, thrifty, prolific and aggressive; leaves lanceolate or oblong; petals white, divided, pod oblong, plump, 2.5-3.5 mm. long.

Introduced from Europe, very recently found in Michigan, where it should be looked after without delay.

Fig. 89 (81).

Charlock. *Brassica arvensis* (L.) B. S. P. (*B. Sinapistrum* Boiss.) An erect, branching, hispid annual, 30-90 cm. high; lower leaves with petioles pinnatifid; flowers yellow, pod 4 cm. long, tipped with a flattened, elongated-conic beak, sometimes one-seeded. Difficult to identify; one mustard is about as bad as another; compare the apex of the pod and the seeds. Introduced from Europe.

Fig. 90 (82).

Rutabaga. *Brassica campestris* L. Smooth or sparingly hairy annuals, 30-90 cm. high; lower leaves petioled, others clasping at the base; flowers bright yellow; pod tipped with a beak. Study and compare the beak and seeds with other species. From Europe, an occasional weed.

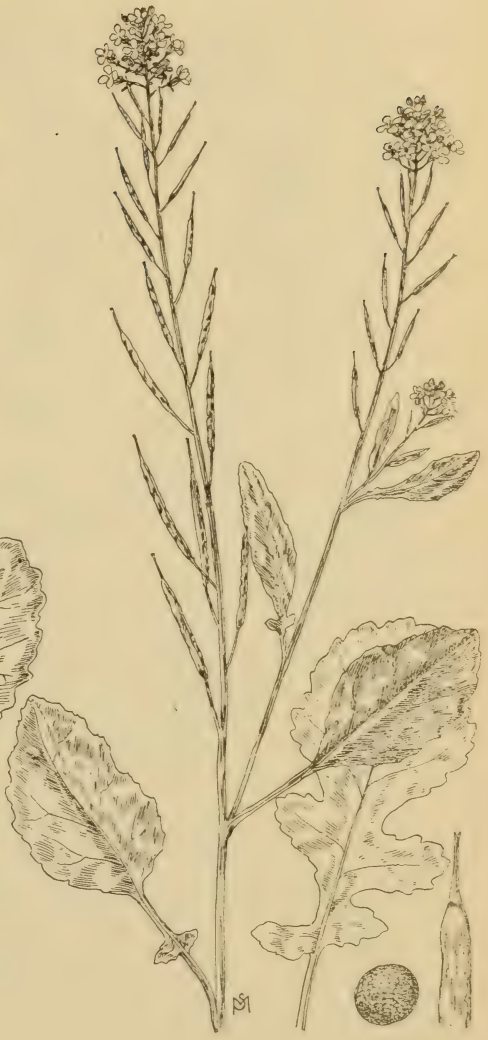


Fig. 91 (83).

Indian Mustard. *Brassica juncea* (L.) Cosson. An erect and branching annual more or less pubescent, 60-120 cm. high, lower leaves petioled, lyrate-pinnatifid; flowers yellow; pods 1.5-1.8 cm. long on short erect pedicels, oppressed, four-sided, beak 2-4 mm. long. Introduced from Europe. Compare beaks and seeds and the figures here represented. A bad weed, often confused with two, three or more others.

Fig. 92 (84).

Black Mustard. *Brassica nigra* (L.) Koch.
Notice the short pod with short abrupt beak. A common weed and aggressive.

Fig. 93 (85).

Small-fruited False Flax. *Camelina microcarpa* Andrz. Annual, 30-60 cm. high; plant more slender than those of the other species; upper leaves auricled, flowers yellow; pods smaller, 4-5 mm. broad.

Introduced from Europe, becoming common in Michigan.

Fig. 94 (86).

False Flax. *Camelina sativa* (L.) Crantz. Annual, 30-60 cm. high, lowest leaves petioled, entire or toothed, 4-6 cm. long, upper leaves clasping, sagitate; flowers yellow, pod obovoid, margined, very slightly flattened, 6-8 mm. broad.

Fig. 95 (87).

Shepherd's Purse. *Capsella Bursa-pastoris* (L.) Medic. A fall annual, or annual, erect, branching, 15-40 cm. high; lower leaves variously pinnatifid, forming a rosette, stem leaves few, sagittate; flowers in racemes, white; fruit flat, triangular, about 5 mm. across. Naturalized from Europe and very widely distributed. Extremely variable.

Fig. 96 (88).

Hare's-ear Mustard. *Conringia orientalis* (L.) Dumort. A smooth, slightly succulent annual, or fall annual, 30-120 cm. high; leaves fleshy, sessile, entire, flowers creamy white; pods erect, square, 7-10 cm. long.

Rapidly spreading in northwest British provinces; sparingly introduced into Michigan, originally from Europe.

Fig. 97 (89).

Sand Rocket. *Diplotaxis muralis* (L.) DC. Annual, smooth or nearly so, branching from the base, 30-60 cm. high; leaves oblong, toothed or pinnatifid; flowers yellow, pods erect, linear, terete.

Introduced from Europe, and where it has been found in Michigan, thrives and spreads at an alarming pace.

Fig. 98 (90).

Worm-seed or **Treacle, Mustard.** *Erysimum cheiranthoides* L. An erect, minutely-rough, annual, or winter annual, 20-60 cm. high; leaves lanceolate, entirely or slightly dentate, 2-8 cm. long, the lower with slender petioles, the upper sessile; flowers yellow, pedicels spreading at about 45 degrees, the pods not quite erect, but taking on uniform positions, four-angled, smooth, 1-2 cm. long.

Probably native to some portions of the north central states and Canada.

Fig. 99 (91).

Apetalous Pepper-grass. *Lepidium apetalum* Willd. Annual or winter annual, more or less hoary, racemes properly branched, lower leaves pinnatifid; petals wanting, or only two minute, and white; pod flat, more or less circular.

Waste places, seldom causing much trouble; when ripe becoming a tumble weed.

Fig. 100 (92).

Field Pepper-grass. Cow Cress. *Lepidium campestre* (L.) R. Br. A diffuse, hoary-pubescent biennial, 10-30 cm. high; stem leaves sessile with an arrow-shaped base; flowers white or yellowish; pods flattened, more or less circular.

Fields and waste places, naturalized from Europe.

Fig. 101 (93).

Hoary Cress. *Lepidium Draba* L. An erect or ascending, hoary perennial, 20-35 cm. high; leaves oblong, entire or dentate, the lower petioled, flowers white; pods flat, broadly ovate.

Introduced from Europe, infrequent in Michigan.

Fig. 102 (94).

Garden Cress. Golden Pepper-grass. *Lepidium sativum* L. A smooth, branching annual, about 30 cm. high; lower leaves two-pinnate; flowers white in long loose racemes, pod flattened, oval.

Introduced from Europe and escaped from cultivation.

Fig. 103 (95).

Wild Pepper-grass. *Lepidium Virginicum* L. A diffuse annual or fall annual, 20-40 cm. high; lower leaves obovate in outline, usually with a large terminal lobe; stem leaves lanceolate, dentate; flowers white; pod flat, nearly circular.

Common in waste places, sometimes a tumble weed; native to this country and introduced into Europe.

Fig. 104 (96).

Ball Mustard. *Neslia paniculata* (L.) Desv. A slender, branching annual, pubescent with star-shaped hairs, leaves oblong, sagittate; flowers in racemes; pods nearly spherical, 2-3 mm. in diameter.

Introduced from Europe into British Provinces of the northwest where it is very aggressive and may soon find its way to Michigan.

Fig. 105 (97).

Tumbling Mustard. Tall Mustard. *Sisymbrium altissimum* L. An erect, smooth, branching annual, 60-120 cm. high; leaves deeply pinnatifid; flowers pale yellow; pods narrow, stiff, diverging, 5-10 cm. long; seeds minute and enormously abundant; when mature the plant loosens from the soil becoming a first-class tumble weed; not yet abundant in Michigan but will soon become so.

Naturalized from Europe, with all the bad characteristics of a mustard.

Fig. 106 (98).

Hedge Mustard. *Sisymbrium officinale* (L.) Scop. A rather stiff, slender nearly smooth biennial, 30-90 cm. high; leaves pinnatifid; flowers small, yellow; pods narrow, stiff, closely pressed to the stem. Not a vicious but a homely weed. Introduced from Europe.

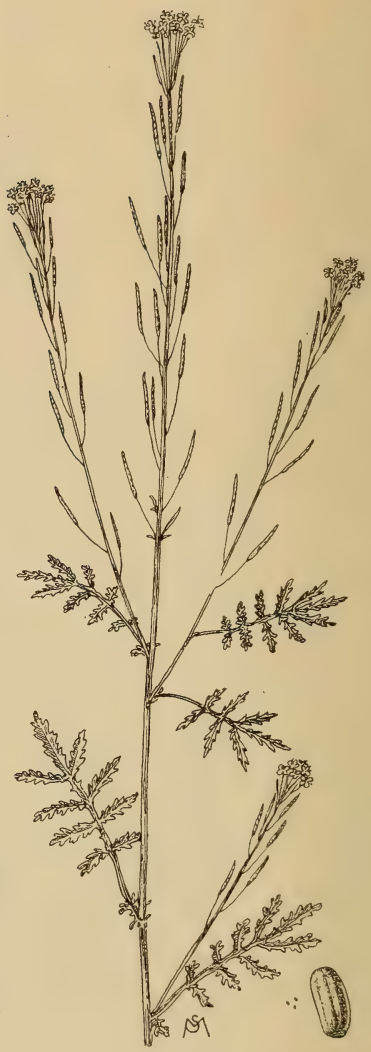


Fig. 107.

Green Tansy Mustard. *Sisymbrium incisum* Engelm. Is causing trouble in the Canadian northwest and may be expected in Michigan.

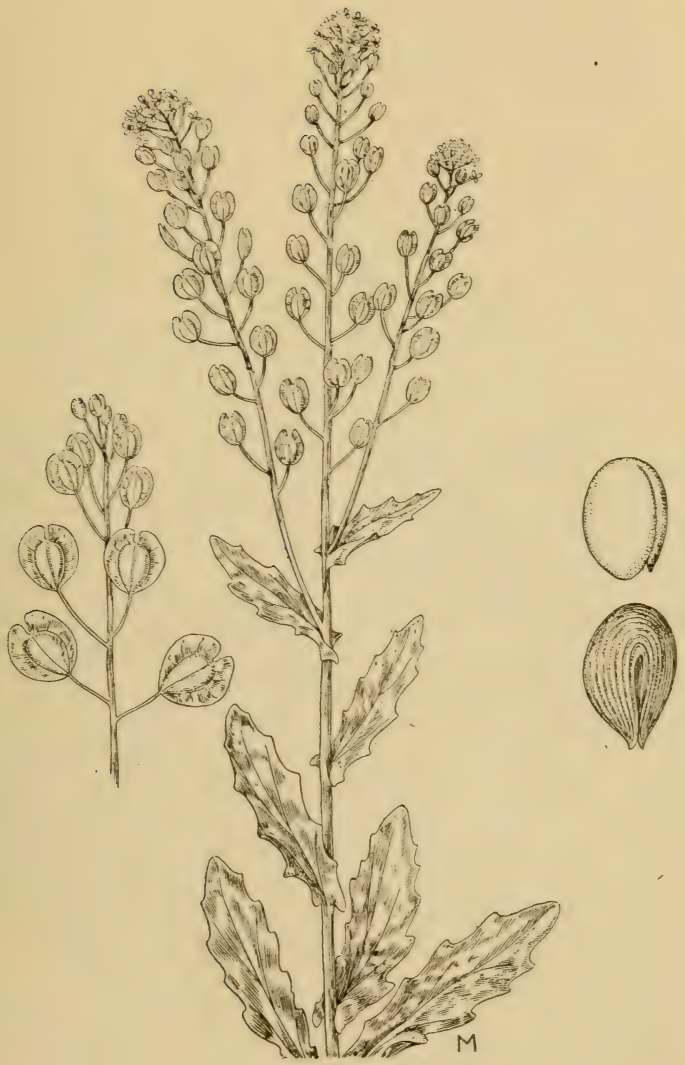


Fig. 108 (99).

Penny Cress. Stink Weed. *Thlaspi arvense* L. A smooth, erect annual, 15-40 cm. high; leaves sessile, the upper sagittate, flowers white; pods thin, flat, nearly circular, 8-16 mm. in diameter, deeply notched at the top. Waste places, ready for a very quick growth. Introduced from Europe. In the northwest a persistent enemy of the wheat grower; the seeds spoiling flour; also flavoring the mutton of sheep that eat the plant and when eaten by cows, giving a bad taste to milk.

ROSE FAMILY. ROSACEAE.

In the most comprehensive sense, this family of moderate size, of 1,500 species, is especially prominent in north temperate region, where it is most remarkable for the extraordinary number of valuable fruits and ornamental plants; it includes apples, pears, quinces, peaches, plums, cherries, almonds, raspberries, strawberries, roses, hawthorns, spiraeas and others; while its weeds are few and insignificant.

ORPINE FAMILY. CRASSULACEAE.

A small family of about 500 species, widely distributed, mostly succulent herbs familiar in species of Live-for-ever and house-leek.

Fig. 109 (100).

Mossy Stonecrop. *Sedum acre* L. A smooth, densely tufted, spreading perennial, 3-8 cm. high; leaves sessile, yellowish green, entire, succulent, 3-5 mm. long; flowers yellow. A pretty little plant, escaped from cultivation, especially abundant in sandy land of cemeteries. Introduced from Europe.

Fig. 110 (101).

Tall Hairy Agrimony. *Agrimonia gyrposepala* Wall. (*A. Eupatoria* in part, not L., *A. hirsuta* Bicknell.) A rough, hairy perennial, 70-120 cm. high; leaves large, thin, leaflets mostly 7, coarsely serrate, interposing segments mostly 3 pairs; flowers yellow; fruiting calyx nearly 1 cm. long; hooks long, widely spreading. Native to this country. Frequent in thin woods where the fruit damages wool.

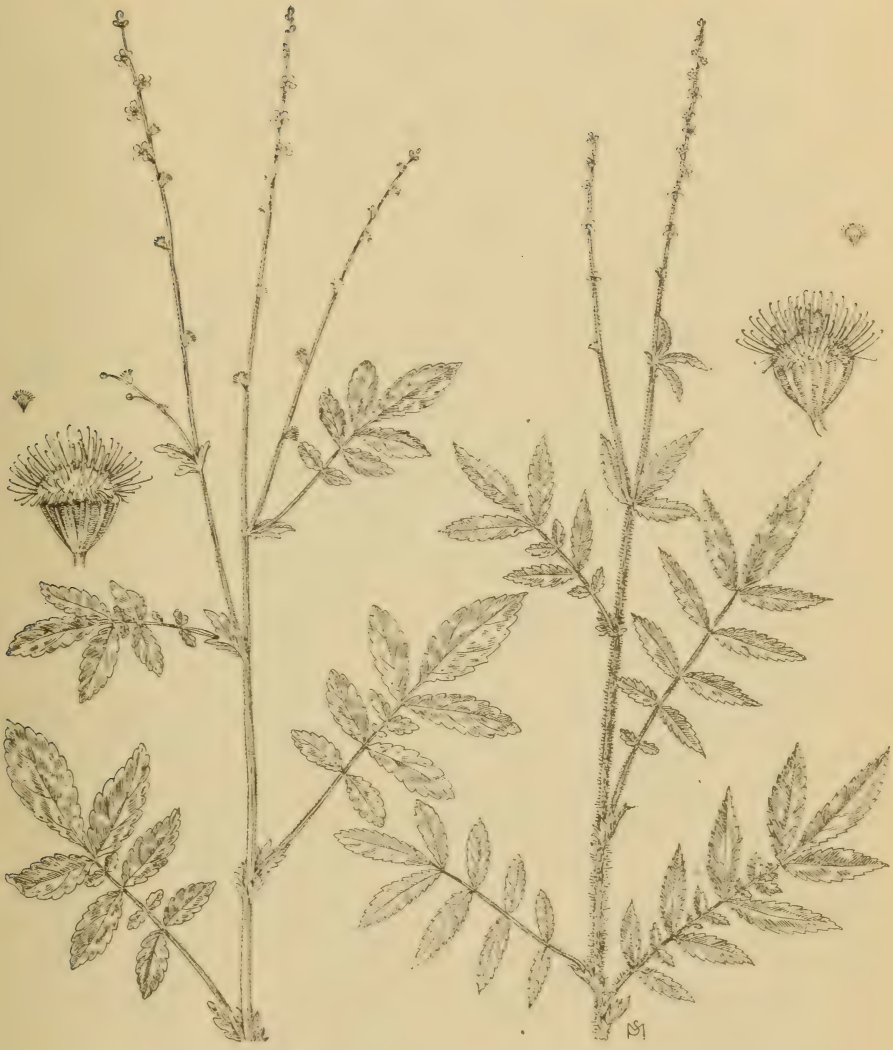


Fig. 111.

Soft Agrimony. *Agrimonia mollis* (T. & G.) Britton. Grayish-pubescent, root tuberous, 40-180 cm. high; larger leaflets 5-9, oblong, thickish, dull green, crenate to dentate, interposed leaflets mostly one pair; flowers yellow, fruit 4-5 mm. wide, slender bristles chiefly in a single row. Dry woods, troublesome to sheep and cattle. Native to this country.

Fig. 112 (102).

Small-flowered Agrimony. *Agrimonia parviflora* Ait. A hirsute perennial, 70-120 cm. high; leaflets 9-17, crowded, lanceolate or narrower, rather thin, serrate, very glandular with many interposed leaflets of 2-3 different sizes; flowers numerous, 5-6 mm. in diameter, fruit small, loosely reflexed. Sandy shady places. Troublesome to sheep and cattle. Native to this country.

Fig. 113 (104).

Five-finger. A Cinquefoil. *Potentilla Canadensis simplex* (Michx.) T. & G. A herbaceous, slender, tufted, hirsute, perennial, spreading by numerous runners; leaflets 5, oblanceolate, serrate, apex obtuse, flowers single, yellow, achenes smooth.

Dry, sandy or thin soil. Native of this country.

Fig. 114 (103).

Silvery Cinquefoil. *Potentilla argentea* L. Stems ascending, tufted, white-woolly, 10-40 cm. long; leaflets 5, oblanceolate, green above, white pubescent beneath; flowers rather large yellow. Dry, sandy, places introduced from Europe and perhaps native.

Fig. 115 (105).

Rough Cinquefoil. *Potentilla Monspeliensis* L. (*P. Norvegica* L.) An erect, stout, hirsute annual or biennial, 20-90 cm. high; leaves three-foliolate; leaflets obovate to oblanceolate; flowers yellow, usually rather densely cymose, calyx large. Open soil, dry or moist. Native, also found in Europe.

PULSE FAMILY. LEGUMINOSAE.

In the most comprehensive sense this immense family, second in size among seed-plants, includes fully 7,300 species, ranking in size next to the Compositae. The family is the most remarkable of any for the great number and variety of its economic plants. So far as known but few plants outside of this family possess roots which furnish abodes for microbes through whose operation free nitrogen becomes available as plant food. These abodes are familiar objects on roots and are known as tubercles or nodules. Plants of greatest value are the clovers, the alfalfas, beans, peas, lentils, lupines, vetches, cow peas, soy beans. In Leguminosae are found plants of great importance for furnishing medicines, timbers, dye stuffs, gums, for beauty of flowers and foliage. It furnishes a very small number of weeds.

Fig. 116.

Tick-trefoil. *Desmodium canadense* (L.) DC. Perennial, stem hairy, 50-150 cm. high, leaflets oblong-lanceolate, obtuse, much longer than the petiole; flowers pink, showy, 8-12 mm. long. Open woods; common in September, when the fruit is maturing especially annoying to sheep and cattle. A dozen or more species of "tick-trefoil" are denizens of open woods, all bearing burs annoying to sheep and cattle.

Fig. 117. (107.)

Bird's-foot Trefoil. Bloom-fell. *Lotus corniculatus* L. Perennial from a long root, stems slender, prostrate or ascending 5-60 cm. long; leaves hairy, leaflets three, each oblanceolate or obovate, stipules much resembling the leaflets; corolla yellow; pod linear, 2-3 cm. long, several seeded. Introduced from Europe and may soon be expected in Michigan.

Fig. 118 (109).

Alfalfa. Lucerne. *Medicago sativa* L. Perennial from a deep stout root; stem 30-40 cm. high, nearly smooth, leaflets three, dentate, varying much in width; flowers bluish purple, rarely yellow or white; pod pubescent twisted into two or three spirals. Placed here not as a weed but for comparison.

Fig. 119 (108).

Black Medick. Nonesuch. *Medicago lupulina* L. Annual, minutely pubescent mostly prostrate, spreading, 30-60 cm. long; leaflets three, obovate or circular, variously toothed; flowers yellow, fruit in heads, pod curved into a spiral, one-seeded. Introduced from Europe and often found in Michigan. The seeds are not unfrequently used to adulterate those of Alfalfa.

Fig. 120 (110).

White Sweet Clover. *Melilotus alba* Desv. Usually biennial, erect, smooth 90-300 cm. high; leaflets three, serrate, varying much in width, 10-20 mm. long, not twisted.

Somewhat extensively sown as a bee plant along highways of the state. Considerably resembling alfalfa, but may be distinguished by smelling of the crumpled leaves, those of Melilotus resembling the odor of the tonka bean. Offensive to cattle, which may be educated to eat it. Valuable to plow under for enriching the land. Seeds used to adulterate those of Alfalfa. Introduced from Europe.

Fig. 121.

Yellow Sweet Clover. *Melilotus officinalis* (L.) Lam. Resembles the former; flowers yellow; thriving on moist clay soil, not much of a weed in Michigan.

Fig. 122.

Rabbit-foot Clover. *Trifolium arvense* L. A slender, erect, silky, hairy annual, 15-25 cm. high; leaflets three, sessile, narrowed at the base; calyx silky; corolla whitish. Not common nor troublesome. Sandy, barren soil. Introduced from Europe.
If eaten by horses, the flower heads collect into balls, closing the intestines.

Fig. 123 (111).

Alsike Clover. *Trifolium hybridum* L. Biennial, perennial (?), smooth, stems weak, 30-60 cm. long; leaves with long petioles, leaflets three; obovate, narrowed at the base, serrulate; heads of flowers without an involucre, peduncle long, corolla pinkish white. Never a weed but placed here for the purpose of comparison.

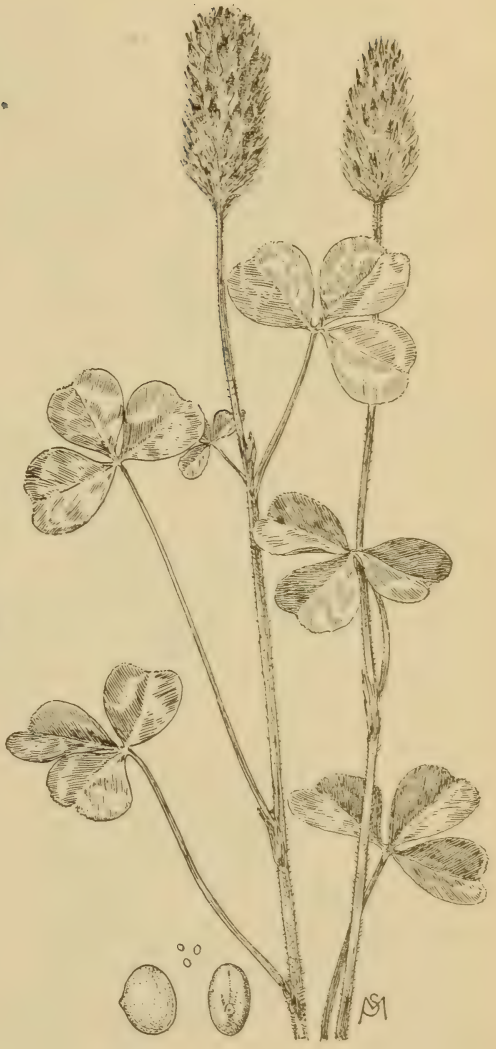


Fig. 124 (112).

Crimson Clover. Scarlet Clover. Italian Clover. *Trifolium incarnatum* L. Annual, erect, soft, pubescent, 15-90 cm. high; leaves long petioled, leaflets nearly sessile, obovate, narrowed at the base, denticulate; heads terminal becoming spikes, 2-5 cm. long; flowers sessile, calyx hairy, corolla crimson, very showy.

Dangerous to feed horses, as the hairy calyces form balls in the stomach and clog the intestines Not a weed but included here for comparison. Introduced from Europe.

Fig. 125 (113).

Red Clover. *Trifolium pratense* L. A well-known useful plant, drawings inserted here for comparison. Introduced from Europe.

Mammoth Clover. A race obtained by selection from red clover from which it gradually merges with all intermediate grades. The seeds of this and red clover are indistinguishable.

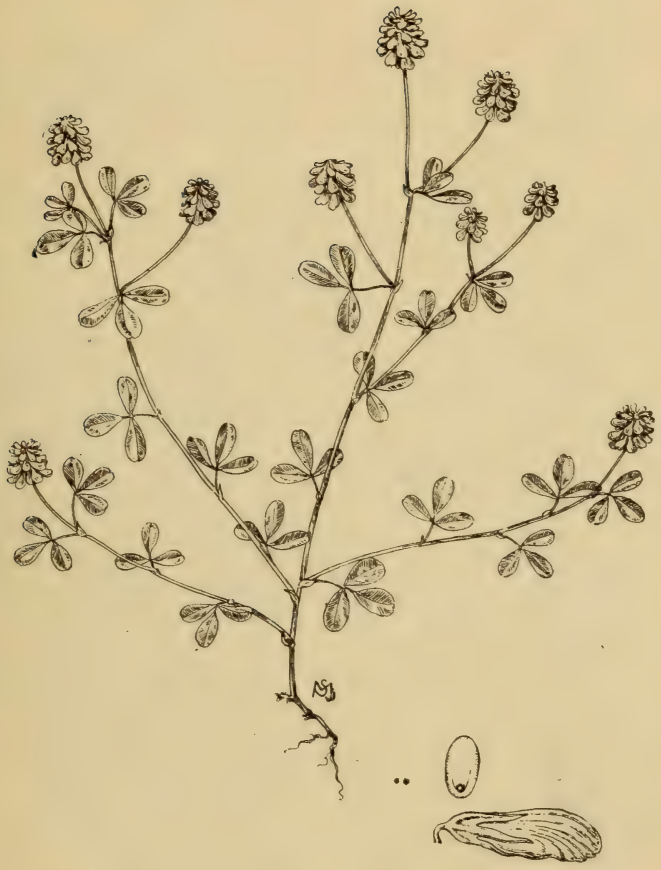


Fig. 126 (114).

Low Hop Clover. *Trifolium procumbens* L. A low, bushy annual, 10-20 cm. high; leaflets obovate, wedge-shaped, finely toothed, the terminal one distinctly stalked; heads 4-lobose; flowers yellow, at length reflexed, corolla striate, becoming brown when dry. Large plants sometimes become tumble-weeds. Introduced from Europe.

Fig. 127.

Yellow Clover. Hop Clover. *Trifolium agrarium* L. Scarcely a weed, much resembles the preceding; the three leaflets of this are all sessile while the center one of the preceding is raised on a very short stem.

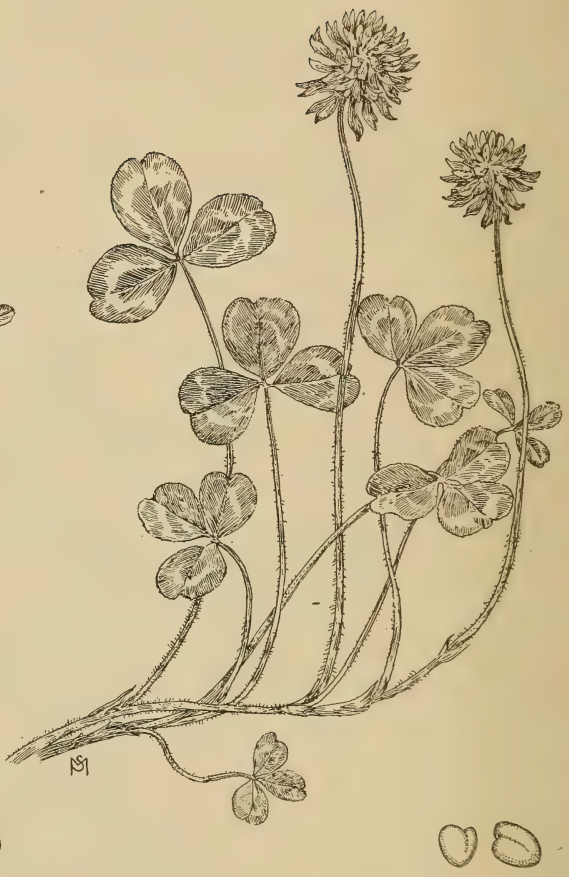
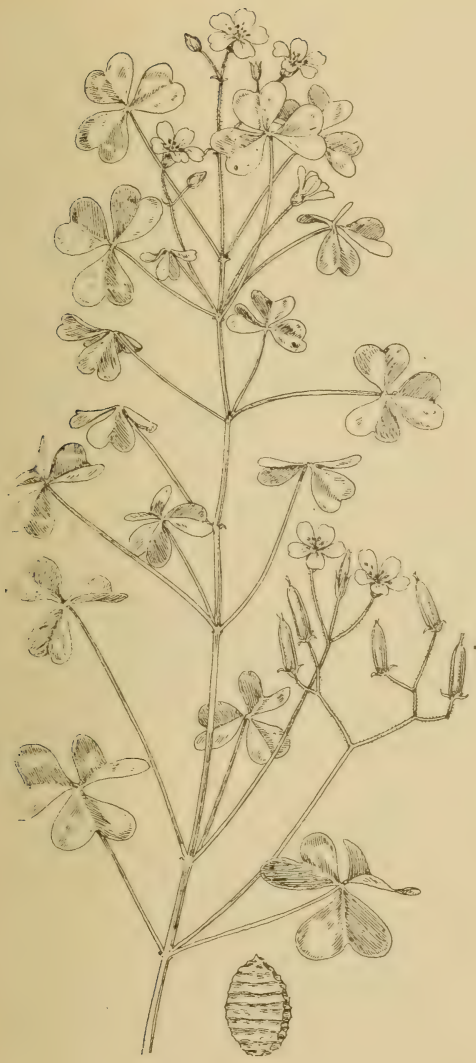


Fig. 128 (115).

White Clover. Dutch Clover. *Trifolium repens* L. A perennial, creeping by the reclined branches which root at the joints, 10-30 cm. long; leaves with long stems, leaflets three, all from the same point, obovate, toothed; heads globose, on long stems; flowers white, the stems finally reflexed when the seeds mature. Scarcely a weed; noticed here for convenience of comparisons. Introduced from Europe.



WOOD SORREL FAMILY. OXALIDACEAE.

A small family containing about 270 species, with clover-like leaves, sour to the taste.

Fig. 129.

Yellow Wood Sorrel. *Oxalis corniculata* L. (*Oxalis cymosa.*) Annual or perennial, pale green herbs, spreading, 15-30 cm. high; leaflets three, closing when touched or at night; flowers yellow; capsule five-sided, 15-22 mm. long. Woods and fields, native to this country.

GERANIUM FAMILY. GERANIACEAE

A small family of herbs or slightly woody plants of 450 species, most abundant in South Africa, where thrive many of the species now in cultivation.

Fig. 130 (116).

Storks bill. Alfilaria. *Erodium cicutarium* (L.) L'Her. A spreading, hairy annual, 15-30 cm. high; leaves pinnate, the leaflets more or less lobed; petals purple or pink. Introduced from Europe.

Fig. 131 (117).

Cut-leaved Crane's Bill. *Geranium dissectum* L. A slender, spreading annual, 10-30 cm. high; leaves deeply cleft into narrow segments; petals purple; lobes of capsule and beak pubescent, seeds shot from the parent plant.

Introduced from Europe; still scarce in Michigan.

Fig. 132 (118).

Small-flowered Crane's Bill. *Geranium pusillum* Burm. f. A weak, slender, spreading, pubescent annual, 10-40 cm. high; leaves circular in outline, deeply divided into 7-9 obes; corolla pale purple, petals minutely notched; lobes of capsule hairy, not wrinkled. Seeds well scattered by the parent plant. Introduced from Europe. A "nasty" little thing.

SPURGE FAMILY. EUPHORBIACEAE.

Plants usually pervaded by an acrid, milky juice; flowers too difficult to understand by any one not well trained; 4,000 species with wide distribution. Croton, Poinsettia, Ricinus are ornamental; a few are weeds.

Fig. 133 (119).

Three-Seeded Mercury. *Acalypha Virginica* L. An erect, dark green or purplish annual, 20-60 cm. tall; leaves mostly ovate, coarsely serrate; flowers monoecious, inconspicuous; the plant has a weedy aspect.

A native widely distributed in open places.

Fig. 134 (120).

Cypress Spurge. *Euphorbia Cyparissias* L. A densely clustered perennial, 10-30 cm. high, milky juice profuse; leaves abundant, very narrow, 2-3 cm. long; flowers and bracts in yellowish clusters, conspicuous. Escaped from cultivation, especially abundant in sandy cemeteries. Introduced from Europe.

Fig 135. (121).

Toothed Spurge. *Euphorbia dentata* Michx. An erect, dull green, pubescent annual, 25-100 cm. high; leaves petioled, ovate, coarsely toothed, 4-8 cm. long, the upper often paler at the base.

A native thriving in rich soil, oftener south of Michigan.

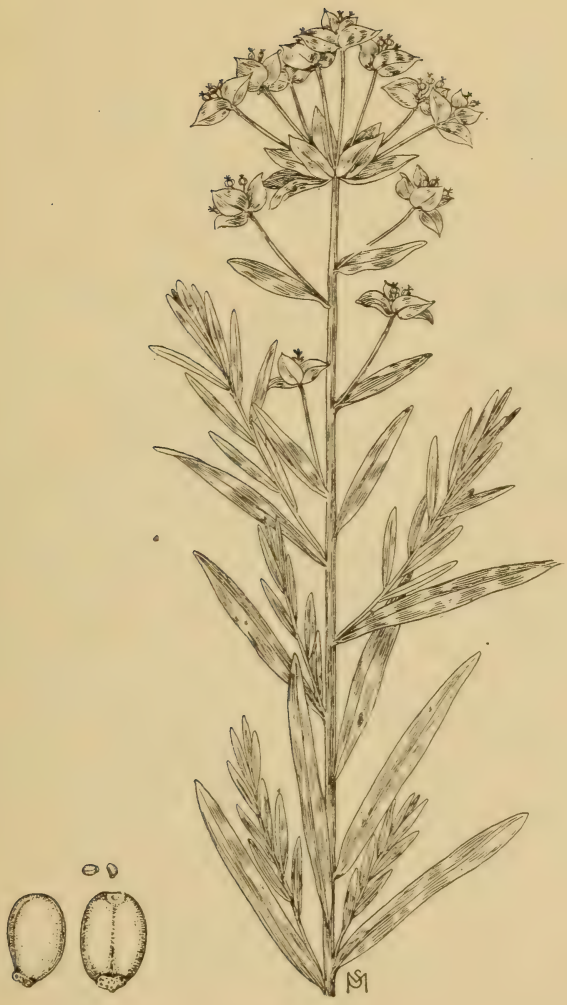


Fig. 136 (122).

Leafy Spurge. *Euphorbia Esula* L. A smooth, erect, perennial, 30-120 cm. high, spreading by rootstocks; leaves numerous, lanceolate; flowers clustered in umbels Waste places, introduced from Europe.

Fig. 137 (123).

Euphorbia hirsuta (Torr). Wiegand. A spreading, hairy annual, branching at the base, 20-30 cm. high; leaves 8-14 mm. long, oblong. Widely scattered.

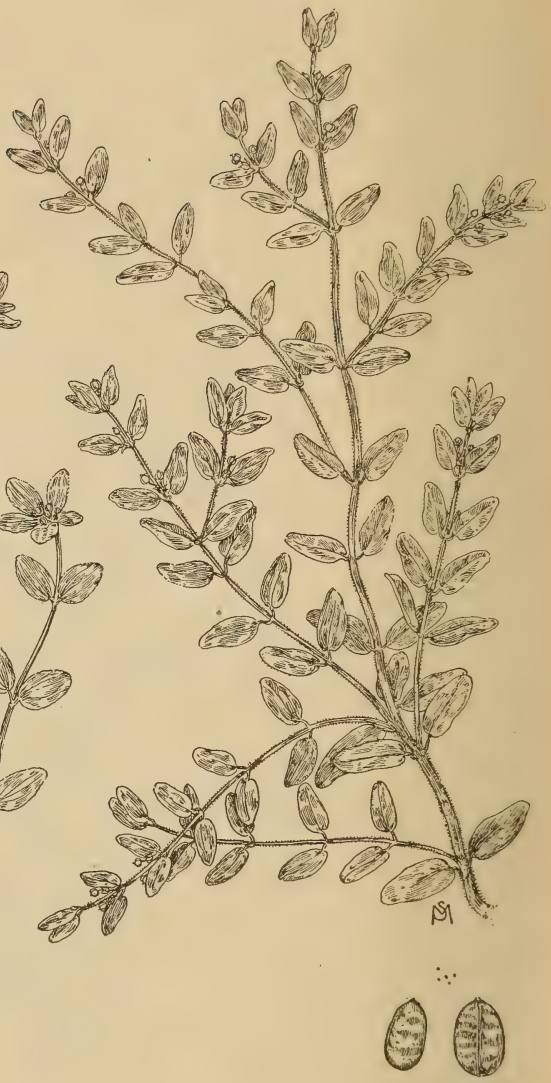


Fig. 138 (124.)

Spotted Spurge. *Euphorbia maculata* **L.** A prostrate, pubescent, dark green annual, 3-15 cm. long, often dark red; leaves usually blotched, oblong, obtuse, very unequal, lobed at the base. Not starting till the weather becomes warm. A native very widely distributed.

Fig. 139 (125).

Upright Spotted Spurge. *Euphorbia Preslii* Guss. (*Euphorbia nutans* Lag.) Annual, mostly smoooth, ascending, spreading, recurved, 15-60 cm. long; leaves oblong, or narrower, often curved to one side, serrate, usually with a red blotch and red margins, lobes unequal.

Native at the east, introduced into Michigan mixed with seeds of red clover.

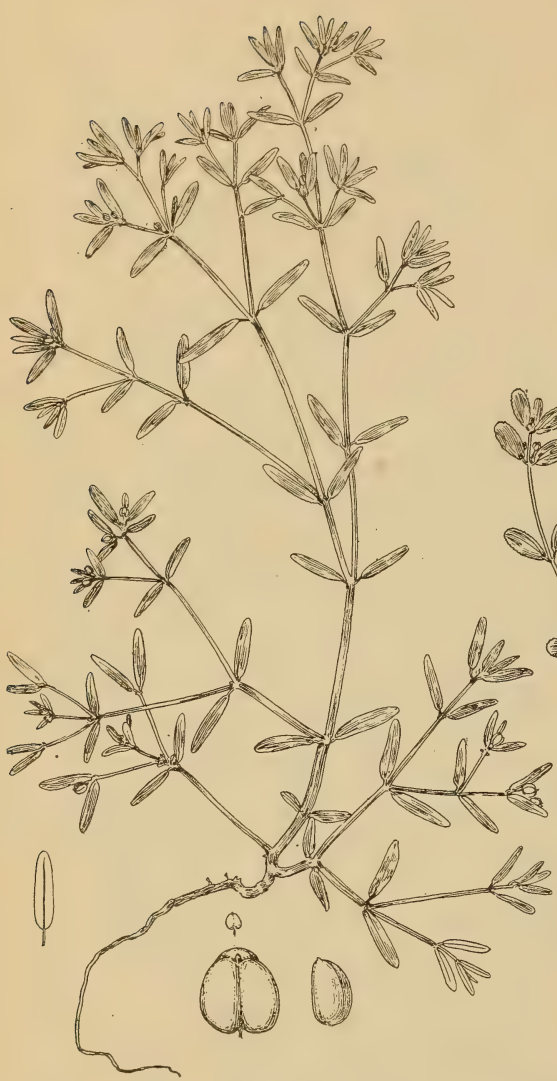


Fig. 140.

Seaside Spurge. *Euphorbia polygonifolia* L. A slender, smooth, pale green, prostrate annual, 7-10 cm. long; leaves linear, fleshy, obtuse, sandy shores of the Atlantic, and the Great Lakes, and more or less inland.

Spurge *Euphorbia.* Half a dozen other species have been found in the state, some of which may become troublesome at any time.

Fig. 141 (126).

Thyme-leaved Spurge. *Euphorbia serpyllifolia* Pers. A smooth, slender, prostrate, spreading annual, dark green or becoming red, 10-30 cm. long; leaves oblong, sharply serrulate, 6-12 mm. long often with a red spot.

A native widely scattered, thriving on sandy soil.

SUMACH FAMILY. CASHEW FAMILY. ANACARDIACEAE.

Trees or shrubs pervaded by resinous or milky, acrid juice; fruit mostly in the form of a drupe. Some of the sumachs are occasionally annoying owing to the fact that the plants spread rapidly by long sprouting roots, but the chief reason for notice here is the fact that some of them are very poisonous to the touch to some persons; about 400 species mostly confined to warm regions.

Fig. 142 (127).

Poison Ivy. *Rhus Toxicodendron* L. A bushy vine climbing by rootlets over walls and up the trunks of trees; leaves compound, consisting of three leaflets, well shown in the illustration. Very poisonous to the touch to many persons. A rather attractive plant. Native to this country.

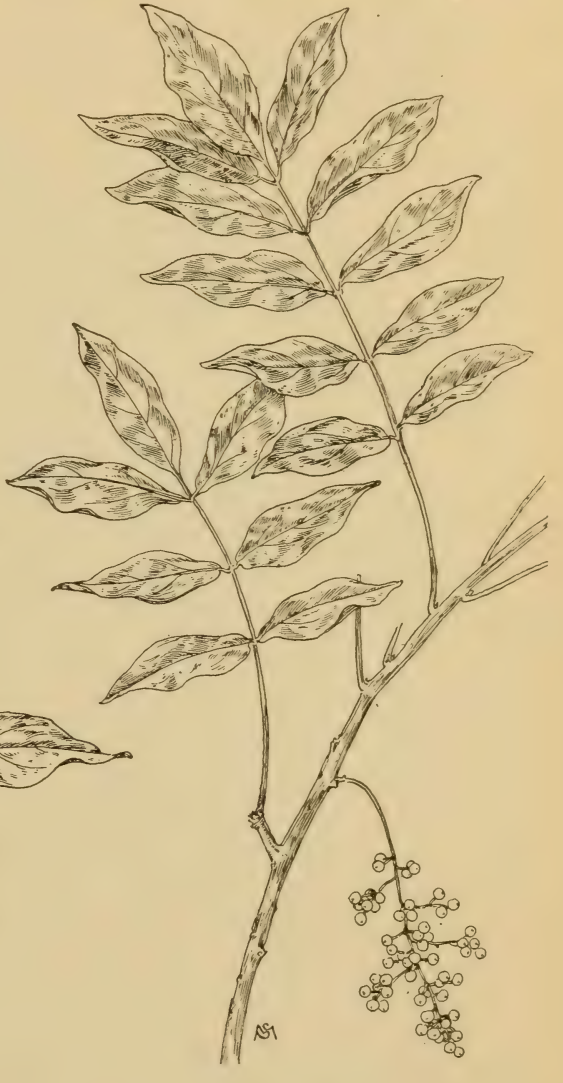


Fig. 143.

Poison Elder. Poison Sumach. *Rhus Vernix* L. A shrub or small tree, 2-5 m. high; leaflets 7-15, obovate-oblong, entire. Thriving in swamps where the leaves assume very attractive tints in autumn. To many persons very poisonous to the touch. Native to this country.

MALLOW FAMILY. MALVACEAE.

Herbs or shrubs, pervaded by an innocent mucilaginous sap. Some species are ornamental, such as Abutilon, Althaea, Hibiscus; a few are weeds. Indian Mallow affords tough bark for cordage. A small family widely distributed in tropical and temperate regions.

Fig. 144 (128).

Velvet Leaf American Jute. *Abutilon Theophrasti* Medic. (*Abutilon Avicennae* Gaertn. *Abutilon Abutilon* Rusby.) A finely velvety annual, 60-120 cm. high; leaves roundish, heart-shaped, velvety; corolla yellow; heads of fruit, 2-2.5 cm. broad; pistils 12-15, beaked, opening with age. Naturalized from Southern Asia, occasionally found in the southern peninsula. The plant likes warm weather and deep rich soil.

Fig. 145 (129).

Bladder Ketmia. *Hibiscus Trionum* L. A low rather hairy annual; upper leaves three-parted; flowers pale yellow with a purple eye; calyx in fruit inflated, five-winged.

Fig. 146 (130).

Common Mallow. Cheeses. *Malva rotundifolia* L. A procumbent biennial or perennial, with a deep tap root; stems 10-30 cm. long; leaves round, heart-shaped, petioles very long; corolla white or pale blue; pistils crowded into a circle about 15 in number. Introduced from Europe; becoming common.

Fig. 147 (131).

Whorled Mallow. *Malva verticillata* L. An erect annual, 1-2 m. high, leaf-blades nearly circular; flowers small white, crowded. Introduced from Europe to the West and from the West to Michigan.

Fig. 148.

Small-flowered Mallow. *Malva parviflora* L. One introduced from the West and grown for two years at the Agricultutal College, perhaps now exterminated. It may come again at any time with seeds of clover or alfalfa.

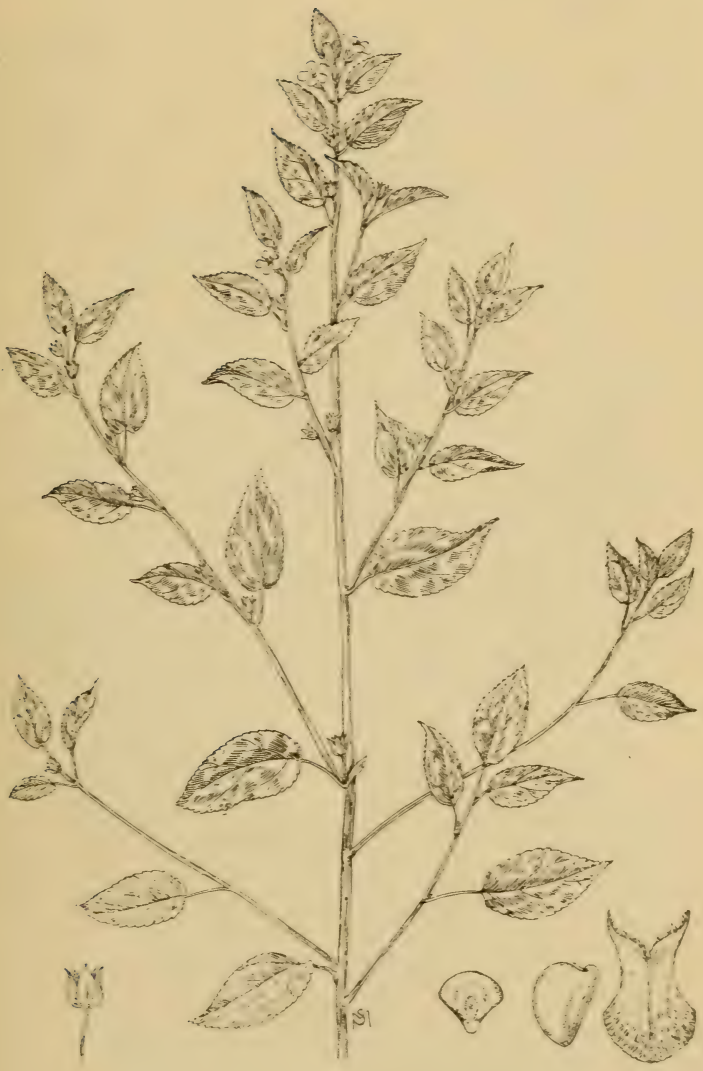


Fig. 149 (132).

Prickly Sida. *Sida spinosa* L. An erect, softly pubescent annual, 30-60 cm. high; leaves mostly ovate, serrate with long stems; flowers small yellow; pistils five-jointed together forming an egg-shaped fruit; each splitting at the top into two beaks. Apparently a native in some portion of the United States. Thriving well southward.

ST. JOHN'S-WORT FAMILY. HYPERICACEAE.

Herbs or shrubs, leaves with pellucid dots, punctate or black. A small family consisting of about 280 species, native of temperate and warm regions.

Fig. 150. (133).

Common St. John's-wort. *Hypericum perforatum* L. A herbaceous perennial. 30-60 cm. high, spreading by runners at the base; leaves sessile, elliptical with pellucid dots; petals deep yellow, black-dotted along the margins, twice as long as the sepals; stamens numerous; pistil three-celled. Rather bad in old meadows and roadsides. Introduced from Europe. Of eighteen or more native species none are weeds.

VIOLET FAMILY. VIOLACEAE.

Herbs or shrubs, of which most violets are usually easily recognized; mostly ornamental and harmless. Pansies are in cultivation for their unique flowers.

About 300 species of wide distribution.

Fig. 151.

Wild Pansy. *Viola arvensis* Murr. A slender, erect, biennial, 20-30 cm. high; petals pale yellow; small; capsule, like most violets, when mature splitting into three pieces, each with seeds attached along the middle, the seeds gradually shot in every direction, some of them to a distance of ten feet on level ground. This habit makes it very difficult to keep within bounds when cultivated in a botanic garden, where it becomes quite a pest. Possibly others may find it troublesome.

EVENING PRIMROSE FAMILY. ONAGRACEAE.

This small family of herbaceous plants contains about 350 species of little prominence in an economic way. In Michigan there are a few bee plants and some herbs.

Fig. 152 (135).

Evening-Primrose. *Oenothera. biennis* L. A rather stout, erect, biennial, 30-150 cm. high; leaves narrow, dentate; corolla yellow, opening only in the evening. Open places, common, native of this country.

PARSLEY FAMILY. UMBELLIFERAE.

This rather large family of herbs containing about 1,600 species includes a considerable number that are poisonous when eaten. Here belong parsnips, carrots, dill, caraway, parsley, poison hemlock, sweet cicely, fennel and coriander. Mostly natives of cool regions; species difficult to identify.

Fig. 153 (136).

Beaver Poison. Water Hemlock. Musquash Root. *Cicuta maculata* L. A rather slender, stiff, open-topped perennial, 1-2.2 m. high, having fleshy roots; leaves compound, the segments serrate; flowers white, fruit borne in compound umbels. A native; abundant on low, moist land. Very poisonous.

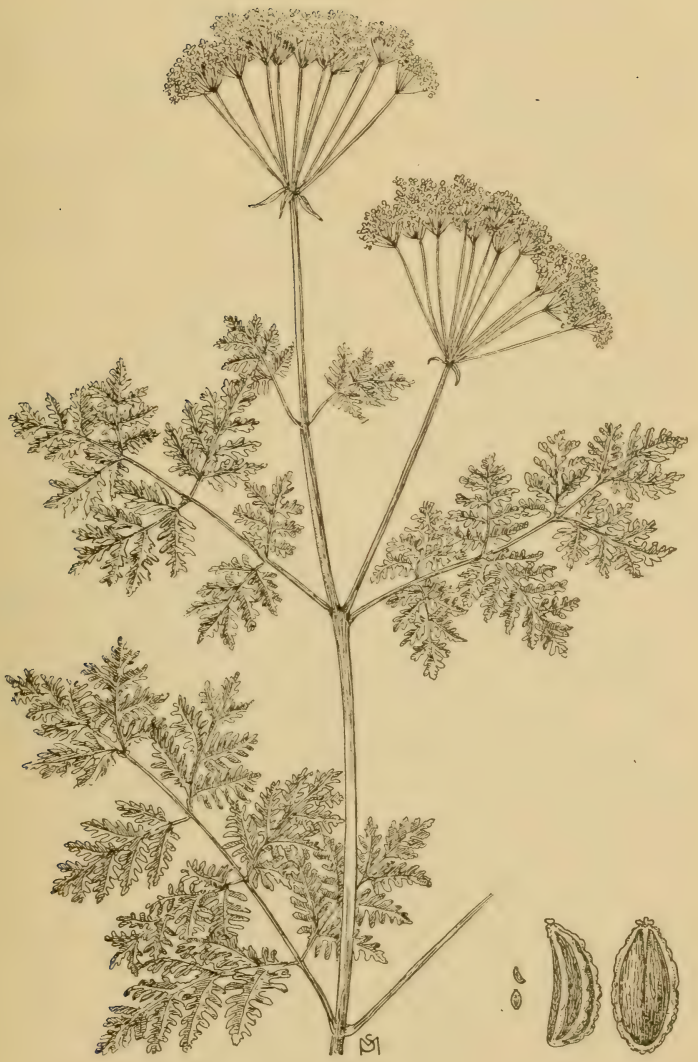


Fig. 154 (137).

Poison Hemlock. Spotted Cowbane. *Conium maculatum* L. An erect, much-branched biennial, stems spotted, 60-150 cm. high; leaves well dissected; flowers white; umbels compound. For details consult some manual of botany. Criminals and philosophers were not unfrequently put to death at ancient Athens by this plant. Introduced from Europe.

Fig. 155 (138).

Wild Carrot. *Daucus Carota* **L.** An erect, rough, bushy biennial, 30-90 cm. high; root more or less fleshy; leaves variously lobed and dissected; flowers white, umbels compound; each half fruit bearing four vertical rows of stiff bristles to aid in dissemination. These bristles rub off when passing through a clover huller. When ripe, the rays of the umbel curve toward each other reminding one of a bird's nest. One of our very worst weeds, widely disseminated and rapidly spreading in old pastures and roadsides. Introduced from Europe. Wild carrot is simply the cultivated carrot escaped from cultivation.

Fig. 156 (139).

Wild Parsnip. *Pastinaca sativa* **L.** A rather stout, smooth, biennial, 60-150 cm. high, stem grooved, leaves pinnate; flowers yellow; umbels compound; fruit flat, broadly oval.

PRIMROSE FAMILY. PRIMULACEAE.

Plants herbaceous, stamens opposite the lobes of the corolla; ovary with one loculus; placenta free central. The family contains primroses, loosestrife, money-wort, pimpernel, American cowslip.

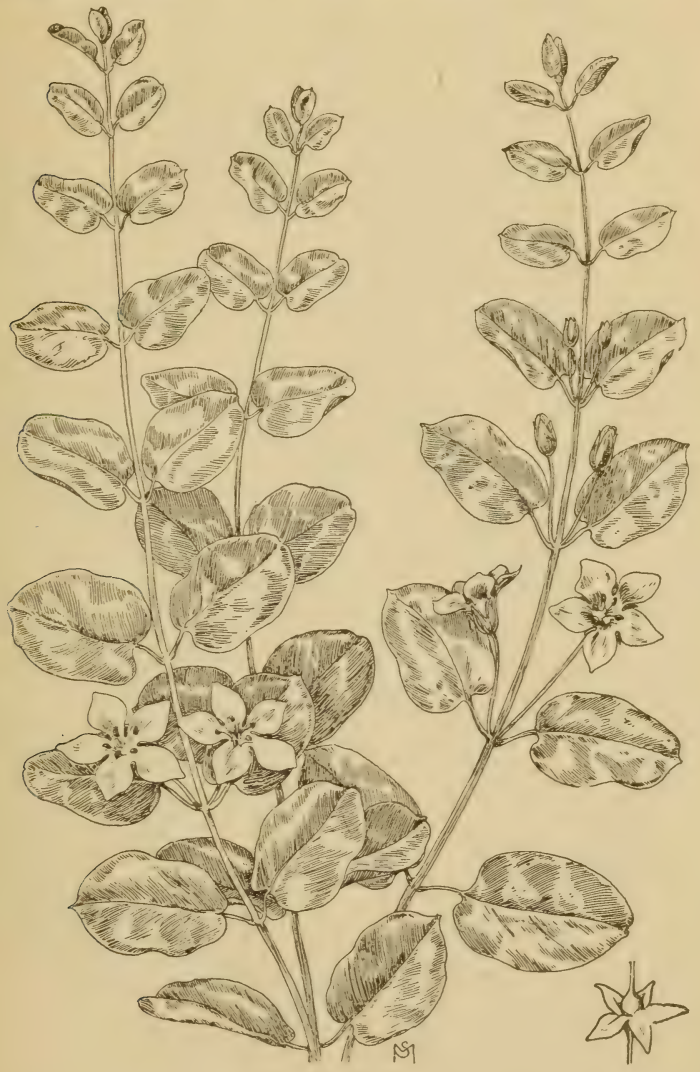


Fig. 157.

Moneywort. *Lysimachia Nummularia* L. A trailing vine with opposite roundish leaves and yellow flowers. A rather pretty plant; escaped from cultivation; introduced from Europe. In some regions a great pest in thin lawns.

DOGBANE FAMILY. APOCYNACEAE.

This family of over 1,000 species mostly found in tropical regions contains herbs, shrubs and trees; ours all herbs, usually abounding in an acrid, milky juice. Botanically nearly allied to the common milk-weeds.

Fig. 158.

Indian Hemp. *Apocynum cannabinum* L. Usually smooth, erect, branching, perennial, 20-240 cm. high, coming from vigorous widely extending rootstalks; bark very tough; flowers small, white; leaves narrow. pods in pairs, terete, about 10 cm. long. A native growing on damp, rich soil, on thin soil smaller and less erect.

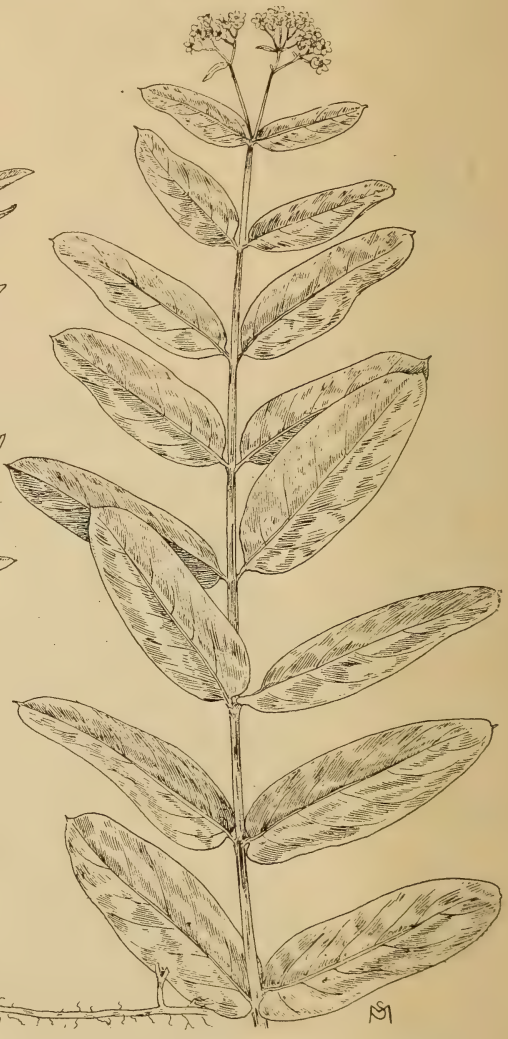


Fig. 159.

Apocynum cannabinum hypericifolium (Ait.) A. Gray. Not so tall, leaves broad at the base, abruptly pointed at the apex.

MILKWEED FAMILY. ASCLEPIADACEAE.

Perennial herbs or shrubs, mostly having milky juice; flowers too peculiar for beginners, mostly born in umbels; pod one-celled, bearing flat seeds with silky hairs at one end.

A large family, containing 1,900 species mostly found in tropical or warm temperate regions.

Fig. 160 (140).

Common Milkweed. *Asclepias Syriaca* L. Stem stout, usually unbranched, finely pubescent, coming from deep, fleshy roots difficult of extermination; leaves opposite, broad, flowers in umbels; pods 8-13 cm. long, covered with soft spinous processes.

A native plant very troublesome on sandy land in the northern part of the state where the crop is undisturbed for more than two years. Occasionally "sick" with a pale, dwarf growth, a bacterial disease.

MORNING GLORY FAMILY. CONVOLVULACEAE.

Chiefly twining vines, often containing milky juice; a few cultivated for ornament, and one, the sweet potato, for its edible roots; a number are leafless parasitic vines.

A rather large family including 900 species, mostly native to the tropics.

Fig. 161 (141).

Black Swallow-wort. *Cynanchum nigrum* (L.) Pers. (*Vincetoxicum nigrum* Moench.) A rather neat, smooth, dark green perennial twining vine; 60-150 long; leaves narrow; flowers small, dark purple; pods about 5 cm. long.

Introduced from Europe and a pest in land not cultivated.

(Fig. 161 belongs to the Milkweed family.)

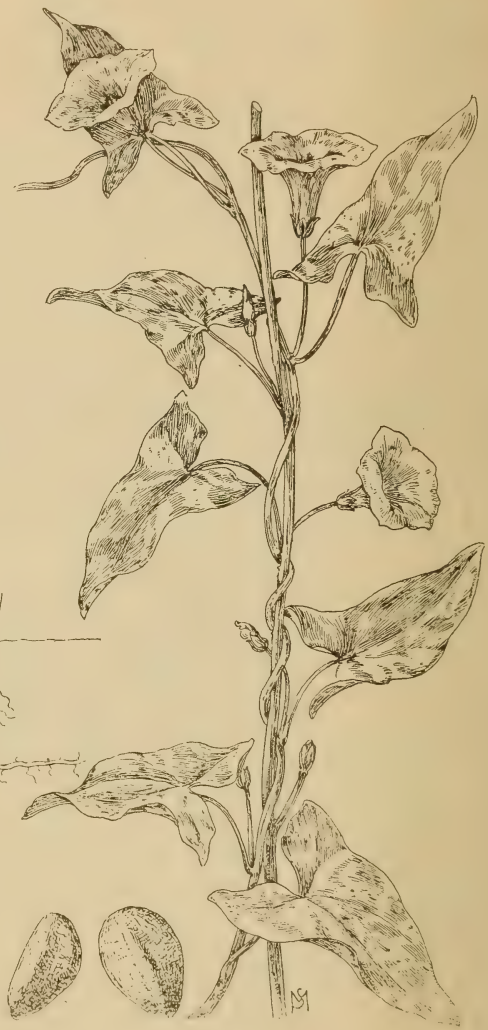


Fig. 162 (142).

Small Bindweed. *Convolvulus arvensis* L. A smooth, slender, prostrate or twining vine from deep, widely spreading, perennial, fleshy roots; leaves arrow or halberd shaped, 2-3 cm. long; flowers bell shaped, seldom abundant, white or tinged with pink, 1.5-2 cm. long.

A very persistent weed when growing in sandy land. Introduced from Europe.

Other names sometimes used; Hedge-bells, Bearbind, Bellbine, Corn-bind, Lap-love, Sheep-bine.

Very troublesome in sand or gravel.

Fig. 163 (143).

Hedge Bindweed. Great Bindweed. *Convolvulus sepium* **L.** A long, trailing or climbing herbaceous vine from a perennial fleshy root, usually smooth; leaves petiolate, blades triangular in outline, halberd-shaped, acute; corolla, bell-shaped, white or tinged with pink, 3-5 cm. long. A native plant seldom producing seeds. Moist soil.

Other names used, Bell-bind, Wood-bind, Lady's Night-cap, Hedge Lily.

Fig. 164. Fig. 165. Fig. 166.

Fig. 164 (144). **Field Dodder.** *Cuscuta arvensis* Beyrich. A pale yellow, slender, leafless, parasitic vine, branching and spreading and more or less exhausting plants of red clover or alfalfa and some other herbs. Flowers small, white, 1.5-2 mm. long.

Fig. 165 (145). **Flax Dodder.** *Cuscuta Epilinum* Weihe. A very slender, pale yellow or red, leafless parasitic vine, branching and spreading and exhausting plants of flax; flowers small, yellowish. Introduced from Europe and troubling flax.

Fig. 166 (146). **Lesser Clover Dodder. Thyme Dodder.** *Cuscuta Epithymum* Murr. An extremely slender, red, leafless, parasitic vine, branching freely and spreading and more or less exhausting plants of red clover, thyme and a few other plants; flowers white or pinkish. Under favorable conditions living near the ground on low plants all winter. Introduced from Europe.

Fig. 167 (147).

Gronovius' Dodder. *Cuscuta Gronovii* Willd. A yellow-orange, leafless, parasitic vine, branching and spreading freely and becoming attached to a great variety of plants, wild balsam, young twigs of willow, nettles, etc.; flowers white. Native to low or moist land.

Fig. 168 (148).

Spanish Dodder. *Cuscuta planiflora* Tenore. A slender, leafless, parasitic vine, branching and spreading over plants of red clover.

Dodder. *Cuscuta.* Other species may be introduced, but their growth and behavior will be much the same as that of the above species.

BORAGE FAMILY. BORAGINACEAE.

Chiefly rough hairy herbs; flowers usually blue or white in one-sided cymes, mostly coiled from the apex when young, and straightening as the successive flowers expand. A rather large family of mucilaginous plants, consisting of 1,500 species.

Here belong heliotrope, mertensia, forget-me-not, gromwell, comfrey, borage, and several weeds.

Fig 169 (149).

Hound's Tongue. *Cynoglossum officinale* L. A stout, coarse, erect, biennial, 40-120 cm. high; corolla reddish-purple; nutlets flat, oblique, roughened with short barbed, hooked prickles, making a sharp bur.

Introduced from Europe into waste places and old pastures.

Fig. 170 (150).

Stick-seed. Bur Seed. *Lappula echinata* Gilibert. (*Echinospermum Lappula* Lehmn.) An erect, rough, annual, 30-60 cm. high; corolla blue. Naturalized from Europe.

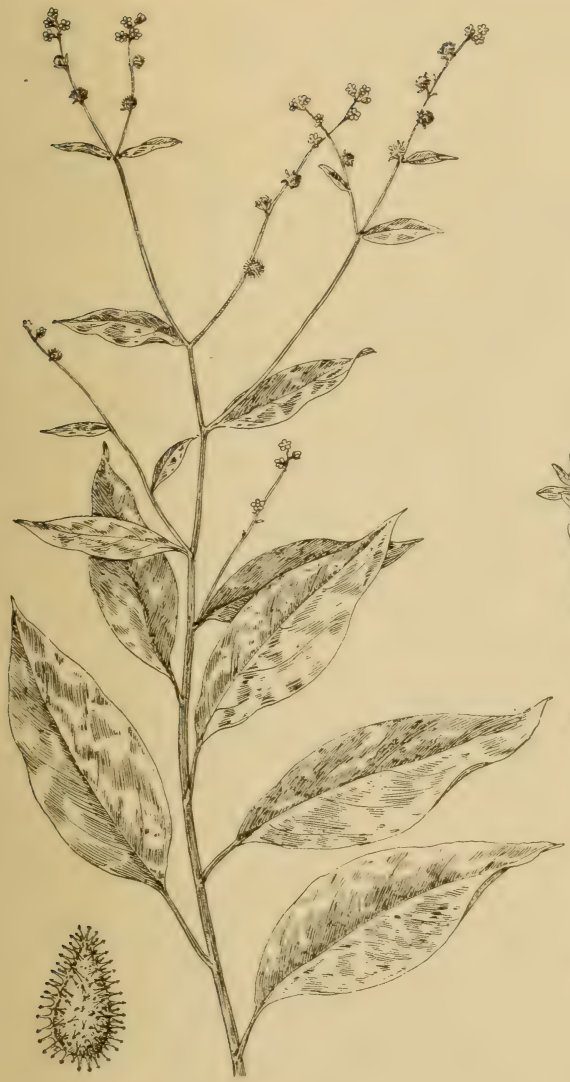


Fig. 171 (151).

Beggar's Lice. *Lappula Virginiana* (L.) Greene. A pubescent, branching biennial, 60-120 cm. high; lower leaves with petioles, blades, round-ovate; upper leaves ovate-oblong, acuminate at both ends; racemes very slender, fruit ovoid. A native of rich woods.

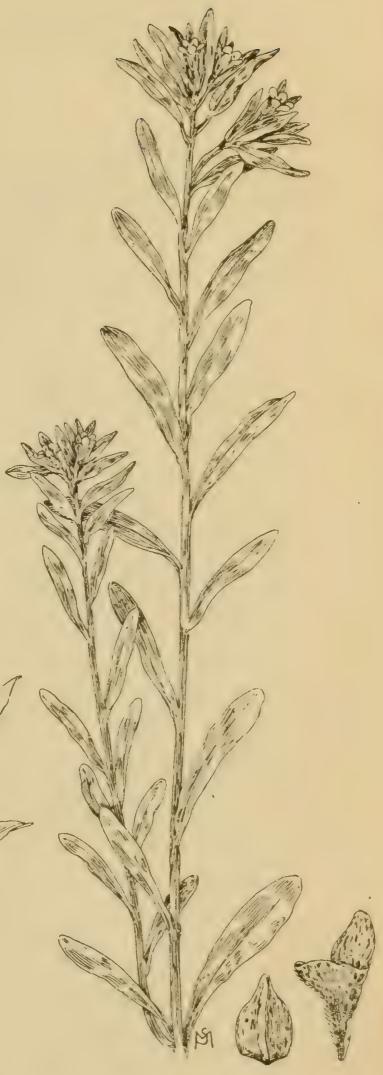


Fig. 172 (152).

Red Root. Wheat Thief. Corn Gromwell. *Lithospermum arvense* L. A minutely roughened and hoary biennial, stems spreading, 20-70 cm. high; leaves narrow; flowers small, white, sessile. Especially a wheat weed, as it needs to grow the same as winter wheat in the fall, maturing the next summer. The size of the nutlets makes it somewhat difficult to screen from wheat. Introduced from Europe.

VERVAIN FAMILY. VERBENACEAE.

This family of 1,200 species widely distributed in temperate and warm regions is not prominent in M chigan. It includes species of Verbena and Lantana cultivated for ornament and two or three native weeds of little prominence. It is in great contrast with the rose family of the same size, which affords so many prominent fruits and the queen of flowers, the rose.

Fig. 173 (153).

Blue Vervain. *Verbena hastata* L. An erect, roughish perennial, 30-200 cm. high; leaves rather narrow, taper-pointed; spikes of flowers narrow, erect; flowers violet-blue. At home in low mucky ground. A native plant.

Fig. 174.

Hoary Vervain. *Verbena stricta* Vent. An erect, downy perennial, 30-90 cm. high; stem four-sided; leaves sessile, obovate or oblong, serrate; spikes thick; flowers purple.

A weed in the prairie regions of the state; introduced from the west.

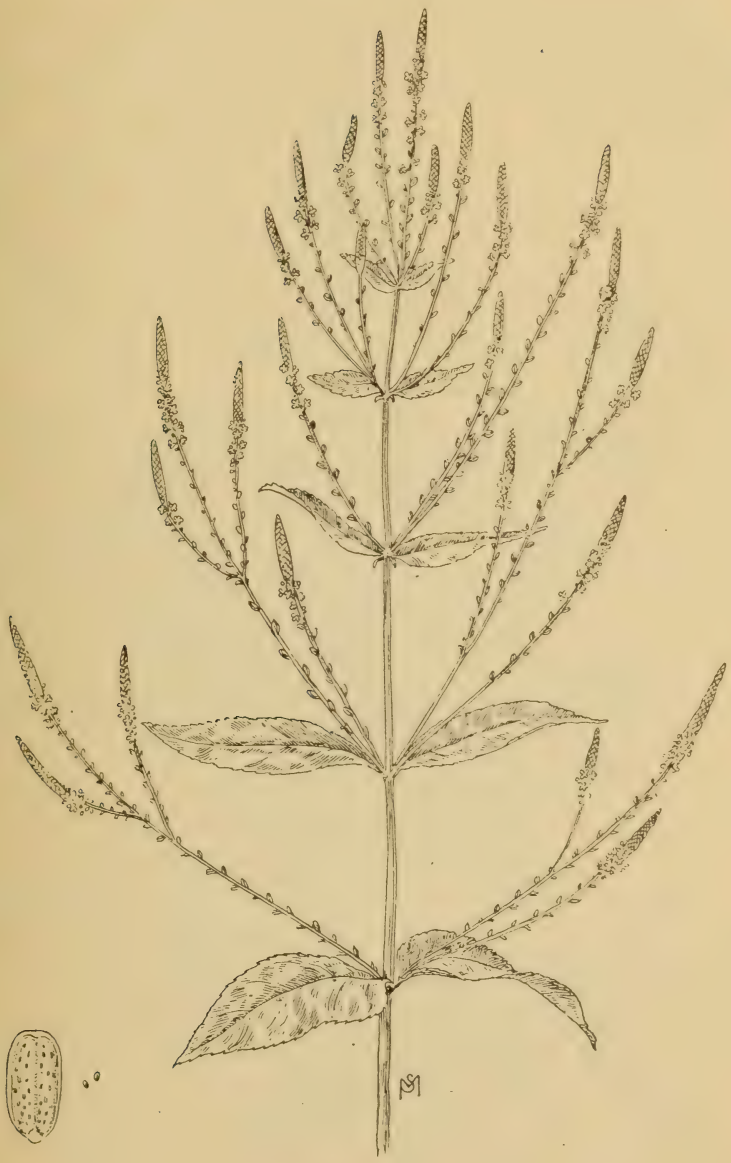


Fig. 175 (154).

Nettle-leaved Vervain. *Verbena urticaefolia* L. Perennial, usually pubescent, stem erect, four-sided; 90-150 cm. high; leaves ovate, or oblong-ovate, coarsely serrate; spikes narrow, interrupted, becoming, 10-15 cm. long; flowers very small, white. Native to low land, hybridizing with *Verbena hastata, V. bracteosa, V. stricta.*

MINT FAMILY. LABIATAE.

A large family of 3,000 species of aromatic herbs or shrubs, having square stems and opposite leaves; flowers irregular, mostly two-lipped; abounding in temperate and tropical regions. Here belong pennyroyal, germander, skullcap, self-heal, dragon heal, sage, motherwort, horehound, peppermint, catnip, hyssop, marjorum, thyme, stone-root, and many more, often known as sweet herbs. There are some grown for the beauty of their flowers or foliage, a few are weeds, but none are grown in Michigan for fruits, vegetables or forage.

Fig. 176 (155).

Dead Nettle. Henbit. *Lamium amplexicaule* L. Annual or biennial, slightly pubescent; stems slender, weak, spreading, 15-30 cm. high; leaves nearly circular in outline, deeply lobed or toothed; flowers in clusters, corolla, red or purplish.
Introduced from Europe and a bad weed in cool weather, dying in hot weather.

Fig. 177 (156).

Motherwort. *Leonurus Cardiaca* L. A rather stout, erect perennial, 60-120 cm. high; leaves with long stems, the blades broad, 3-5 cleft; corolla pink or purple.
In waste places, introduced from Europe.

Fig. 178 (157).

Hoarhound. *Marrubium vulgare* L. A bitter, whitish-woolly perennial, 30-90 cm. high; leaves veined, circular to oval; densely many-flowered, corolla small, white.

Introduced from Europe, and thrives in waste places where plants are protected all winter by snow.

Fig. 179 (158).

Catnip. Catmint. *Nepeta Cataria* L. A downy, erect, pale green perennial, 60-90 cm. high; leaves heart-shaped, oblong, deeply notched; corolla whitish, dotted with purple. A rather shy weed making little or no trouble. Introduced from Europe.

Fig. 180 (159).

Self-heal. Heal-all. Blue-curls. *Prunella vulgaris* L. Hairy or smooth, perennial, often procumbent, 15-40 cm. high; leaves ovate-oblong, entire or toothed; corolla violet, purple or white. Waste places, especially in thin lawns, old meadows and pastures. Introduced from Europe.

POTATO FAMILY. NIGHTSHADE FAMILY. SOLANACEAE.

Herbs or shrubs, foliage rank scented, fruit ranging from very poisonous to edible berries; prominent in the tropics, about 1,600 of them. Here are found the potato, tomato, ground cherry, tobacco, petunia, Jimson weed, henbane, matrimony vine, bittersweet, horse nettle, buffalo bur, apple-of-Peru.

Fig. 181 (160).

Jimson Weed. Thorn Apple. *Datura Stramonium* L. A coarse, narcotic, poisonous, annual, 30-150 cm. high, stems green; corolla white, funnel form, 7-10 cm. high; capsules ovoid, stiff, prickly, about 5 cm. long.

In waste places; introduced from Europe.

Fig. 182 (161).

Purple Jimson Weed. Purple Thorn Apple. *Datura Tatula* L. A coarse, narcotic, poisonous, annual. 30-150 cm. high, stem purple; corolla pale violet-purple, funnel-form, 7-10 cm. high; capsules ovoid, stiff, prickly; very nearly like *D. stramonium* excepting the stems are purple. (The differences being mainly those of color, the same illustration is made to serve for both).

Naturalized from Europe, waste places.

Fig. 183.

Apple-of-Peru. *Nicandra Physalodes* (L.) Pers. (*Physalodes physalodes* (L.) Britton.) An erect, coarse, smooth annual, 60-150 cm. high; stem angled; leaves ovate, toothed, narrowed at the base; calyx enlarged, bladder-like in fruit, enclosing a spherical, dry berry; corolla bell shaped, white with purple spots. Calyx like that of *Physalis*, leaves like those of *Datura*. Waste places, introduced from Peru.

Fig. 184 (163).

Black Nightshade. *Solanum nigrum* L. Usually smooth, branching and spreading, annual, stem rough on the angles, 30-45 cm. high; leaves ovate, wavy-toothed, more or less unequal sided; flowers white; berries spherical, black, appearing as if introduced.

Very extensively distributed as a weed. The berries make good pies; not poisonous when fully ripe.

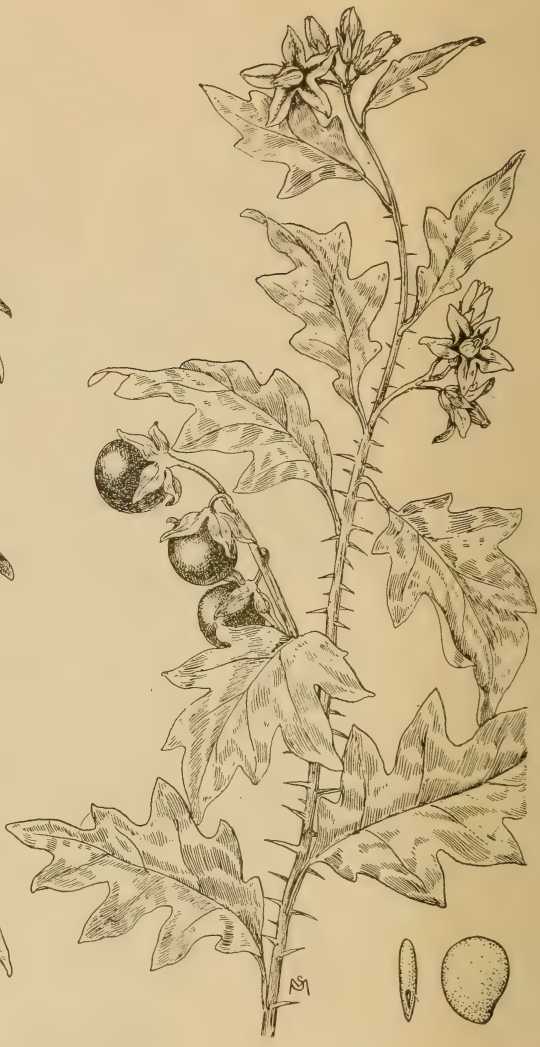


Fig. 185 (162).

Horse Nettle. Apple of Sodom. *Solanum Carolinense* L. Perennial, rough-pubescent with four-eight-pronged hairs, and stout yellow prickles, erect, 30-120 cm. high coming from numerous deep wandering roots; leaves somewhat resembling those of red oak; berry 1-1.5 cm. broad.

Sandy soil and waste grounds, coming from the southwest.

FIGWORT FAMILY. SCROPHULARIACEAE.

A large family of seed plants consisting of 2,500 species most abundant in temperate regions. Its botanical peculiarities on one side shade off into the potato family and on the other into the mint family.

A remarkably small number of plants are distinguished for economic qualities. A few are ornamental, a few are weeds; there is not a "fruit," "vegetable" or forage plant in the list.

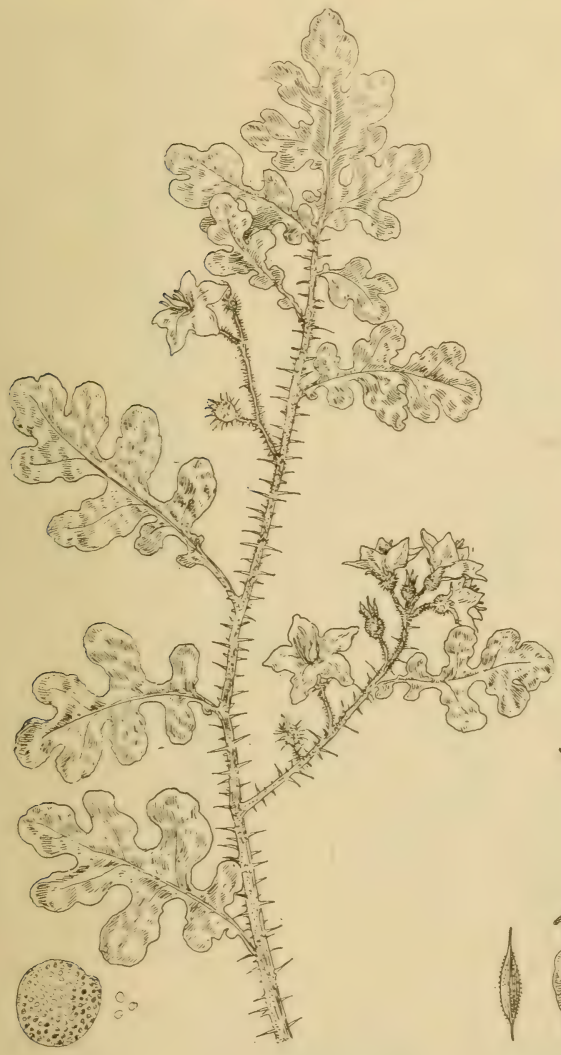


Fig. 186 (164).

Beaked Nightshade. *Solanum rostratum* Dunal. A very prickly, bushy, yellowish, annual, 30-60 cm. high; leaves pinnately-lobed; calyx densely prickly; corolla yellow; fruit a formidable, spiny bur, about 3 cm. in diameter.

Waste places, hailing from the south and west, where it was the original food of the famous potato beetle.

(Fig. 186 belongs to Nightshade family.)

Fig. 187 (165).

Butter and Eggs. Toadflax. *Linaria vulgaris* Hill. (*Linaria Linaria* (L.) Karst.) A pale green, erect perennial, 30-90 cm. high, spreading by slender underground stems; leaves very numerous, very narrow; flowers light yellow and dark orange having a spur at the base.

Naturalized from Europe and widely distributed as a weed in temperate regions.

Fig. 188 (166).

Moth Mullein. *Verbascum Blattaria* L. Biennial, stems slender, erect, branching but little, 60-120 cm. high, smooth or sparingly covered with glandular hairs; leaves rather narrow; raceme loose, simple, long; corolla yellow or white.

A bad weed in old grass land or along road sides. Introduced from Europe.

Fig. 189 (166).

Common Mullein. Velvet-leaved Mullein. *Verbascum Thapsus* L. Biennial, densely woolly throughout, stem simple, erect stout, 30-200 cm. high; leaves oblong, extending down the stem (decurrent); flowers yellow in a very long dense spike.

Introduced from Europe and widely dispersed especially on land recently cleared and in old pastures.

Fig. 190 (167).

Corn Speedwell. Wall Speedwell. *Veronica arvensis* L. Annual, pubescent, simple or branched, 5-40 cm. high; lower leaves petioled, oval, the upper sessile narrow, entire; corolla blue or nearly white.

Cultivated grounds, in old thin grass land Naturalized from Europe.

Fig. 191 (168).

Common Speedwell. *Veronica officinalis* L. A prostrate, pubescent perennial, spreading by stems rooting at the joints, 7-25 cm. high; leaves oblong, petioled, serrate; racemes narrow, densely flowered; corolla pale blue.

Dry fields and woods, probably a native plant.

Fig. 192 (169).

Neckweed. Purselane Speedwell. *Veronica peregrina* L. Annual, erect, smooth or slightly glandular, 10-30 cm. high; lowest leaves petioled, blades oblong, thickish, the upper leaves sessile, white. Common as a weed in cultivated ground.

Apparently introduced from Europe.

Fig. 193 (170).

Thyme-leaved Speedwell. *Veronica serpyllifolia* L. Perennial, nearly smooth, creeping, much branched, 5-20 cm. high; leaves all opposite and petioled, ovate; raceme loose, corolla whitish or pale blue with deeper stripes. Native and introduced.

PLANTAIN FAMILY. PLANTAGINACEAE.

A small family of herbarious plants, consisting of 200 species, in our region conspicuous for a number of weeds.

One of the peculiarities of the dry fruit in this; when mature it opens all round with a transverse seam.

Fig. 194 (171).

Sand Plantain. *Plantago arenaria* W. & K. A pubescent and somewhat viscid annual; leaves 60-30 cm. high; narrow, opposite or whorled; pod one-seeded.

Found at Harrisville, introduced with clover seed, originally from Central Europe.

Fig. 195 (172).

Large-bracted Plantain. *Plantago aristata* Michx. A dark green annual, usually hairy, 15-30 cm. high; leaves narrow, entire, often three-ribbed; spikes dense, 4-12 cm. long.

Often introduced from the west with clover seed; so far not usually spreading in Michigan.

Fig. 196 (173).

Rib-grass. Narrow-leaved Plantain. Buckhorn. *Plantago lanceolata* L. Mostly perennial, more or less hairy, 30-50 cm. high; leaves narrow, 3-5 ribbed, oblong-lanceolate, entire.

Naturalized from Europe, one of our very worst weeds, as its seeds cannot be readily separated from seeds of red clover; and it springs up very quickly after the lawn mower, becoming very unsightly.

Fig. 197 (175).

Rugel's Broad-leaved Plantain. *Plantago Rugelii* Decne. Leaves thinner, always crimson at base, spikes thin, 30-60 cm. high. This species has invaded fields of the farm and become a serious pest; often found in seeds of red clover, a native to some portions of our country.

Fig. 198 (174).

Broad-leaved Plantain. *Plantago major* L. Perennial, smooth or hairy, 15-90 cm. high; leaves light green, 3-11-ribbed, base of all leaves without tinge of crimson.

Possibly a native of some region of North America. Not a vigorous weed in Michigan.

MADDER FAMILY. RUBIACEAE.

An immense family of 5,500 species of wide geographical distribution, abundant in tropical regions The coffee plant belongs here, Partridge berry, Bed Straw, Button Bush. One weed is noticed Here are a few of the common names applied to species of *Galium*: Cleavers, Goose-grass, Bushead Clover-grass, Cling-rascal.

Fig. 199. Fig. 200. Fig. 201.

Fig. 199. *Galium asprellum* Michx.

Fig. 200. *G. circaezans, G. lanceolatum, G. pilosum, G. trifidum, G. boreale.*

Fig. 200a (176). **Blue Field Madder.** *Sherardia arvensis* L. Through an oversight no drawing of 200a was prepared. A slender, tufted, roughish, prostrate plant, 7-25 cm. high; leaves in fours and sixes, narrow; fruit crowned with the 4-6, calyx teeth. Introduced into this country from Europe and spreading with clover seed.

Fig. 201. **Sweethearts.** *Galium Aparine* L. Annual, weak, climbing over plants, by means of stout, recurved prickles on the stems, 60-150 cm. high; leaves in sixes and eights, narrow, in 1-3-flowered clusters; fruit densely covered with sharp hooked bristles. Widely distributed under some 70 common names; probably introduced from Europe.

A considerable number of other species of *Galium*, such as *G. lanccolatum, G. pilosum, G. trifidum G. boreale*, mostly natives grown in woods become a pest to sheep, if allowed to roam about in late mm e r and autumn.

TEASEL FAMILY. DIPSACACEAE.

A very small family of coarse herbs consisting of only 140 species. Natives of the old world. Species of scabious are grown for ornament. The fuller's teasel is grown for the purpose of placing the ripened heads, with their stiff-hooked prickles in revolving frames to produce nap on cloth.

Fig. 202 (177).

Common Teasel. *Dipsacus sylvestris* Huds. A coarse, prickly biennial, 60-180 cm. high leaves sessile, opposite; heads 7-10 cm. long; flowers lilac in color. Waste places rom Europe.

THE THISTLE FAMILY. THE ASTER FAMILY. COMPOSITE FAMILY. COMPOSITAE.

This includes the Chicory Family and the Ragweed Family, sometimes considered as distinct from the Compositae. Botanically this family ranks highest of any. In the most comprehensive sense this immense family of seed plants consists of 11,450 species—much the largest of all. The flowers are produced in heads; the anthers are united into a tube which surrounds the style; there is only one seed to a flower.

Here are found large numbers of showy flowers in cultivation, such as asters, dahlias, chrysanthemums and the largest contributions to the weeds of any family. To the vegetable garden the best it can do is to furnish lettuce, endive, chickory, artichokes, sunflowers. It does not furnish a single plant of importance for meadows or pastures possibly excepting yarrow, which takes a low rank for meadow, pasture and lawn.

Fig. 203 (178).

Yarrow. Milfoil. *Achillea Millefolium* L. Stems simple, slightly woolly, perennial from horizontal rootstocks, 30-60 cm. high; leaves many times finely dissected into almost thread like pieces; heads numerous, small, in a flat-topped cluster, ray flowers white or pink. It seems to be native to this country as well as native to Europe.

Fig. 204.

Biennial Wormwood. *Artemisia biennis* Willd. An erect, smooth, biennial, 30-120 cm. high; leaves divided; heads crowded in short spikes, very numerous, about 3 mm. broad. Introduced into moist ground from the west.

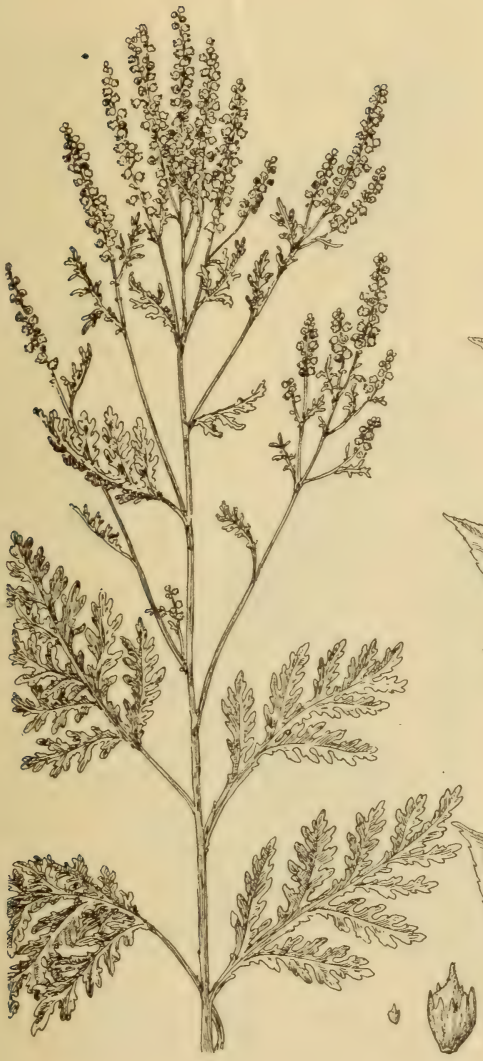


Fig. 205 (179).

Ragweed. Hogweed. *Ambrosia artemisiifolia* L. A hairy, much branched, very variable annual, 30-180 cm. high; leaves thin, cut lobed; racemes of the male flowers very numerous, female heads clustered above the base of the leaves.

Fig. 206 (180).

Great Ragweed. King Head. *Ambrosia trifida* L. A rough or nearly smooth, branched annual, 1-6 m. high; leaves deeply 3-5-lobed; racemes of male heads 4-20 cm. long, female heads clustered above the leaves.

Fig. 207 (181).

Corn Camomile. *Anthemis arvensis* L. Usually annual, not strong scented, finely pubescent, much branched, about 30 cm. high; leaves sessile, on or twice cut lobed; heads usually num 3-4 cm. broad; the ray flowers white.

Fig. 208 (182).

May-weed. Dog-fennel. *Anthemis Cotula* L. Annual, ill smelling, much branched, sometimes pubescent, 30-60 cm. high; leaves finely dissected; heads numerous, about 2 5 cm. broad, rays white.

Fig. 209 (183).

Great Burdock. *Arctium Lappa* L. A large, fine-wooly, coarse, biennial, 1-2 m. high; leaves large mostly heart shaped; heads clustered, 3-5 cm. broad, the outside scales hooked at the top making a formidable bur; flowers purple.

So far as the writer has observed, there are no plants of this species in the state, the following species having heretofore passed for this one. Introduced from Europe.

Fig. 210 (183).

Common Burdock. *Arctium minus* Bernh. A large, fine-wooly, coarse, biennial, 1-2 m. high; leaves mostly heart shaped; heads clustered, 1.5-3 cm. broad, bracts hooked at the apex; flowers purple; abundant in certain portions of the state.

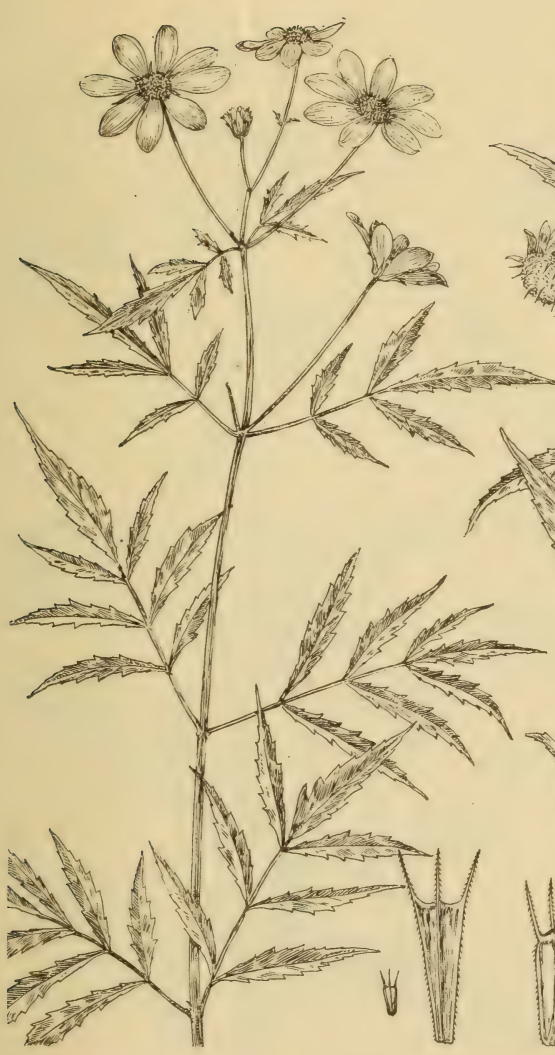


Fig. 211.

Western Tickseed. *Bidens aristosa* (Mich.) Britton. Annual or biennial, much branched, more or less pubescent, 30-90 cm. high; leaves thin, lobes narrow; heads numerous, ray flowers 6-9, showy; achenes flat, upwardly ciliate bearing two parallel teeth.

A native found in swamps and wet land.

Fig. 212 (185).

Stick-tight. Nodding Bur. Marigold. *Bidens cernua* L. Erect, branched, smooth or rough, annual, 20-70 cm. high; leaves narrow, clasping the stem at the base; heads globose, nodding; ray flowers yellow, 6-10 or more.

Fig. 213.

Leafy-bracted Tickseed. *Bidens comosa* (A. Gray) Wiegand. A smooth, straw colored annual, 15-120 cm. high; leaves narrow, not compound; heads few, large; ray flowers wanting; achenes about 1 cm. long, nearly smooth, awns, three-barbed downward.

A native, growing in wet soil.

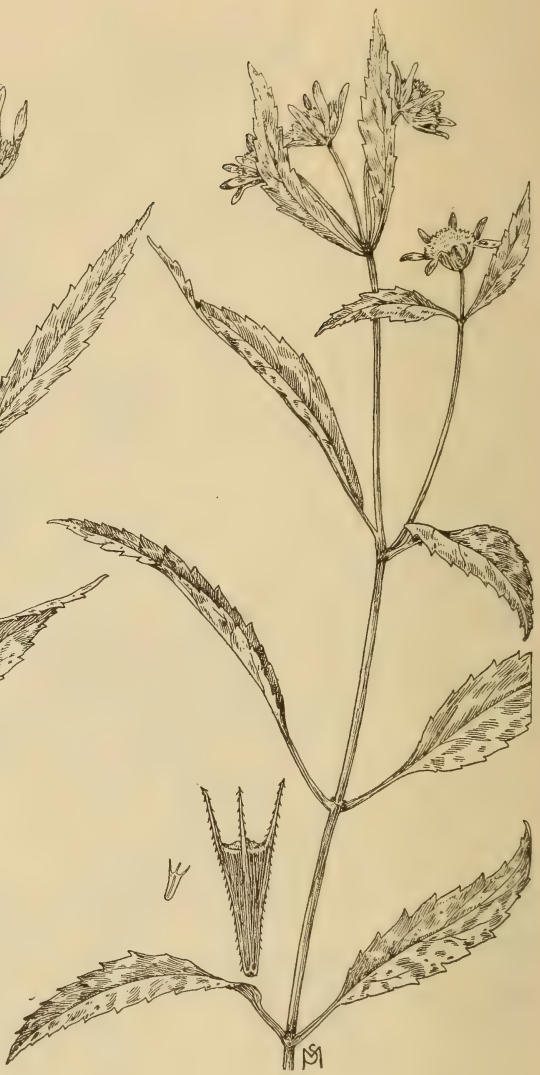


Fig. 214 (186).

Purple-stemmed Swamp Beggar-ticks. *Bidens connata* Muhl. A smooth, purple, erect, much-branched annual, 15-200 cm. high; leaves narrow; ray flowers none or small.

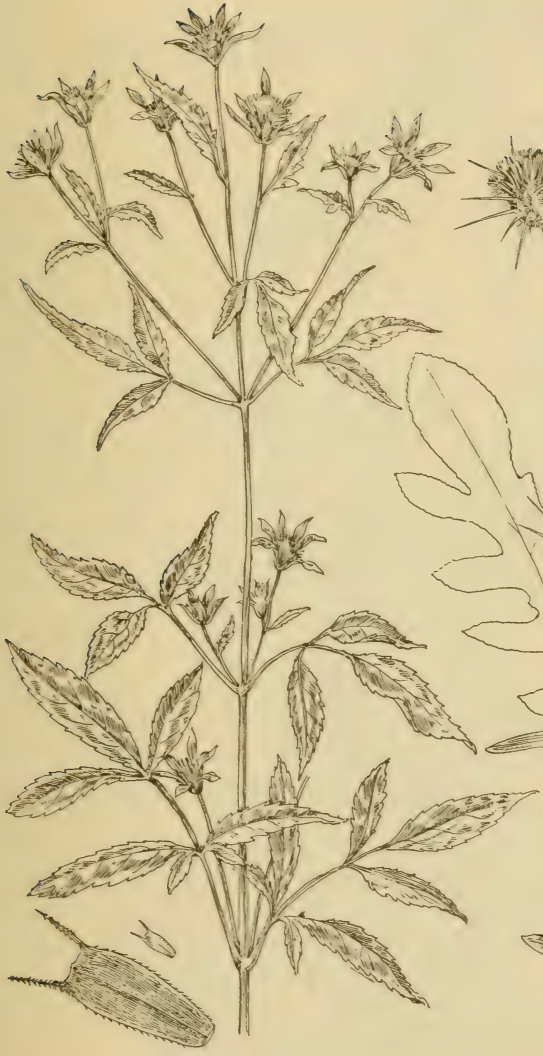


Fig. 215 (187).

Beggar Ticks. Stick-tight. *Bidens frondosa* L. An erect, branched, mostly smooth, annual, 60-250 cm. high; leaves thin, 3-5 divided, the sections narrow; rays none; achenes flat, oval, the two slender awns barbed downward. Damp soil.

Fig. 216 (188).

Star Thistle. *Centaurea solstitialis* L. A straggling plant, gray, with loose wooly hairs, 30-50 cm. high; stem leaves small, narrow, each with one margin growing down the stem; heads about 1.5 cm. broad, some of the stout spiny scales yellow, spreading, 12-18 mm. long.

Fig. 217 (189).

Ox-eye Daisy. *Chrysanthemum Leucanthemum pinnatifidum* Lecoq and Lamotte. Stem erect, branching but little, 30-50 cm. high, perennial from spreading rootstocks; lower leaves mostly spatulate, stem leaves partly clasping; heads 4-6 cm. broad, with 20-30 white rays. Not yet very common in Michigan.

Fig. 218 (190).

Chicory. Blue Sailors. *Cichorium Intybus* L. Whole plant pervaded by milky juice; stem stiff, rough, much branched perennial, 30-90 cm. high, from a long, deep top-root; leaves long, narrow, variable; heads numerous; flowers bright blue.

Waste places, introduced from Europe. Sometimes cultivated for use of the roots as a substitute for coffee or to mix with coffee.

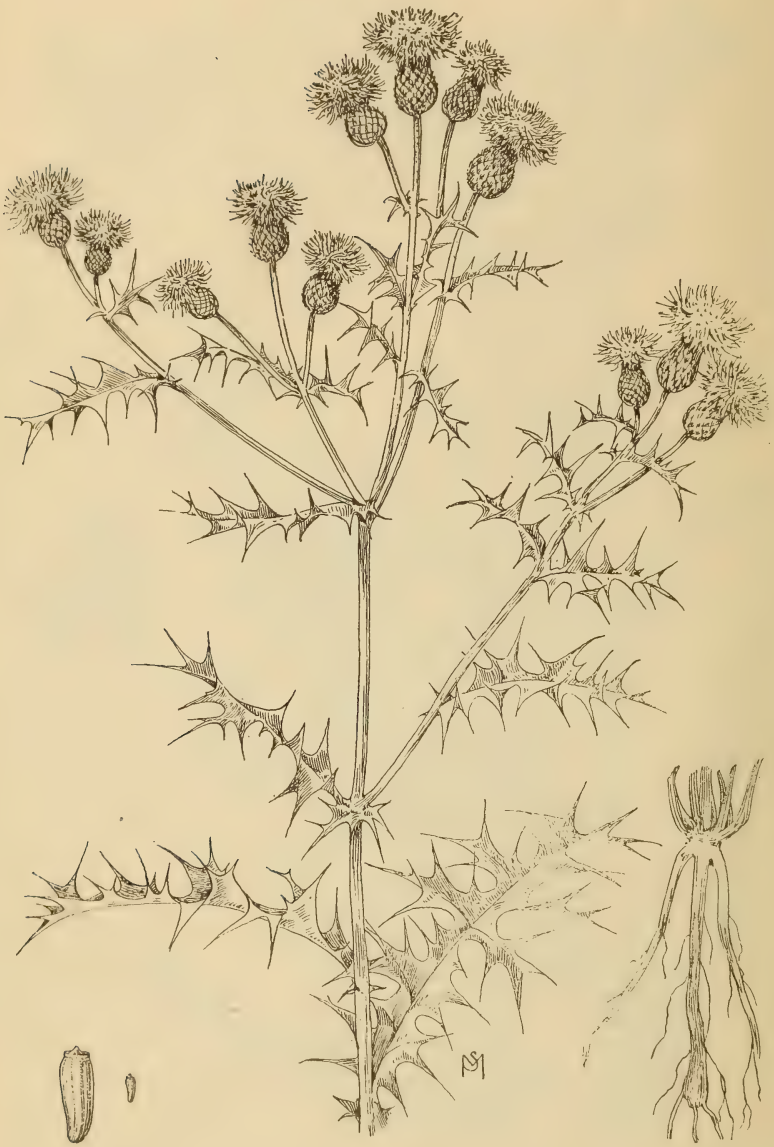


Fig. 219 (191).

Canada Thistle. *Cirsium arvense* (L.) Scop. (*Carduus arvensis* (L.) Robs.) A slender, nearly smooth perennial, 30-90 cm. high from extensively creeping rootstocks; leaves narrow, the margins bending irregularly up and down, backward and forward, each lobe always terminating in a sharp stiff point; flowers rose purple or whitish; scales of the heads not bristly pointed; each seed as it grows usually produces a male plant or a female plant; by rootstocks a half acre or more is often the result of a single seed.

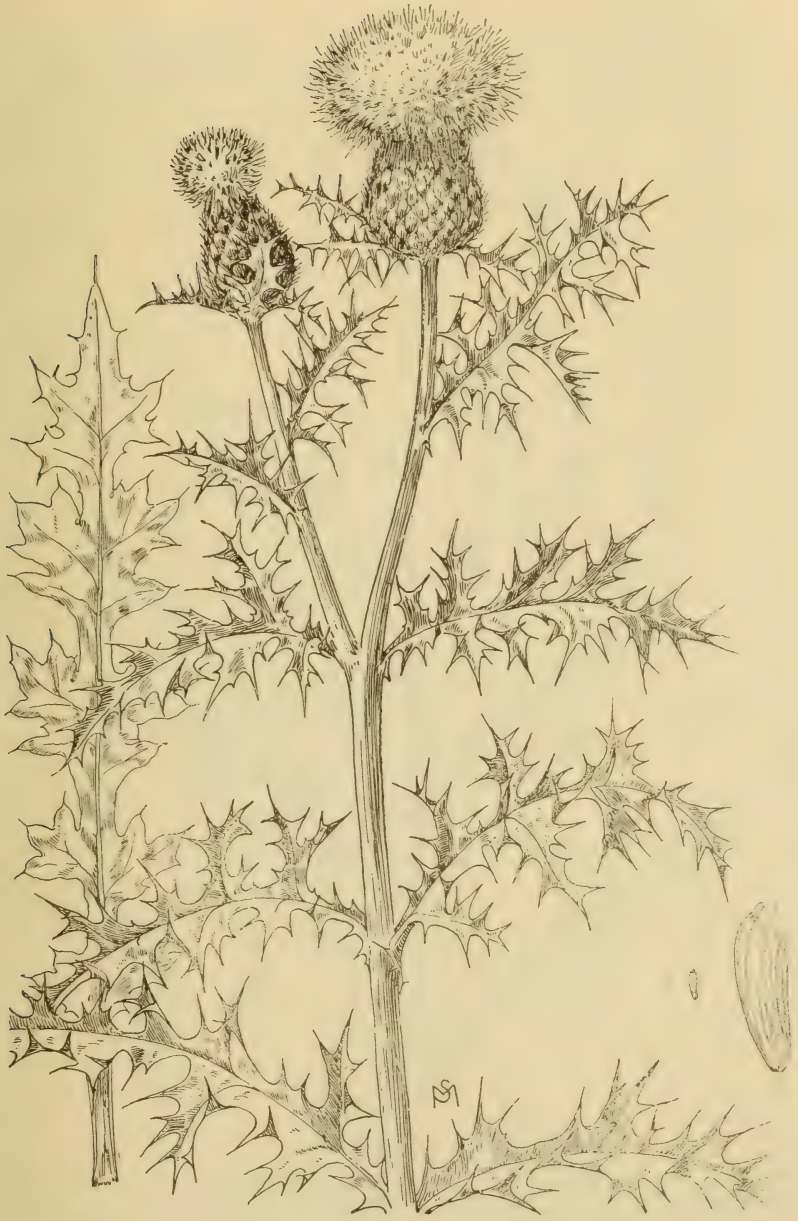


Fig. 220 (192).

Common or Bull Thistle. *Cirsium lanceolatum* (L.) Hill. (*Carduus lanceolatus* L.) A stout, woolly, branched biennial, 90-150 cm. high; leaves variably lobed, extending down the stem (decurrent), everywhere each wavy lobe terminates in a formidable prickle; heads large, mostly solitary, the scales of the involucre each terminating in a bristly prickle.

Fig. 221 (194).

Fire-weed. *Erechtites hieracifolia* (L.) Raf. Annual, mostly smooth, erect, coarse, homely plants with a rank smell, 30-180 cm. high; leaves narrow, variable.

A native plant, springing up in recently burned clearings and where low land has been cultivated. Sometimes harvested in quantities and distilled for the oil.

Fig. 222 (196).

Daisy Fleabane *Erigeron annuus* (L.) Pers. A rather slender, erect, leafy biennial, 20-150 cm. high, beset with spreading hairs, lower leaves ovate, mostly obtuse, coarsely toothed, upper narrower, sharply toothed, marginal flowers very numerous, white or tinged with purple. Study well and com-pare with *Erigeron ramosus*. The achenes are so nearly like those of *E. ramosus* that it did not seem worth while to make drawings of the species.

A native weed; especially abundant in thin grass land.

Fig. 223 (196).

Daisy Fleabane. *Erigeron ramosus* (Walt.) B. S. P. Slender, erect, biennial, pubescence closely appressed, 60-150 cm. high; stem-leaves narrow, mostly entire, closely resembles *E. annus* with which carefully compare; found together in similar places, though this species likes sandy and gravelly soil. Stem smaller and more simple than the preceding, with smaller heads but longer rays.

Fig. 224 (195).

Horse-weed. Mare's-tail. A Fleabane. *Erigeron canadensis* L. (*Leptilon canadense* (L.) Britton.) Erect, bristly-hairy, 60-270 cm. high; leaves very numerous,, very narrow; heads very numerous, bearing very short rays on the margins. A native plant now of wide distribution at home and abroad. Waste places, common and abundant. Sometimes cut and distilled for the oil.

Fig. 225 (198).

Low Cudweed. *Gnaphalium uliginosum* L. Annual, much branched from the base, covered all over with appressed wool, 5-30 cm. high; leaves narrow, spatulate; heads small in clusters, bracts brownish.

Fig. 226 (197).

Sweet Life Everlasting. *Gnaphalium polycephalum* Michx. (*G. obtusifolium* L.) Erect, annual or winter annual, fragrant, fine, woolly, 30-70 cm. high; leaves narrow, heads small, numerous, the bracts on the outside whitish, thin, paper-like (scarious).

Fig. 227 (199).

Broad-leaved Gum-plant. Tar-weed. *Grindelia squarrosa* (Pursh) Dunal. Perennial or biennial, smooth, erect, 20-60 cm. high; leaves narrow; often spatulate, base more or less clasping; bracts of the involucre strongly spreading, very glutinous, flowers yellow, native in the west, introduced with seeds of clover and grasses.

Fig. 228 (202).

Elecampane. *Inula Helenium* L. A coarse, stout, erect, pubescent perennial, 60-180 cm. high; lower leaves ovate, petioled, 20-45 cm. long, the upper partly clasping; ray flowers yellow, numerous.

Fig. 229.

Jerusalem Artichoke. *Helianthus tuberosus* L. Stem rough, stout, branched, 120-300 cm. high, perennial by numerous tubers; leaves ovate or narrow, three-nerved, sharp pointed; rays 12-20, yellow, occasionally cultivated and spreading as a weed.

Fig. 230 (200).

Devil's Paint-brush. Orange Hawkweed. *Hieracium aurantiacum* L. A slender, thin, hairy, perennial, 20-60 cm. high, usually spreading by runners, juice milky; leaves mostly at the ground, spatulate; flowers orange-red, showy. Introduced from Europe and escaped from cultivation. A terrific weed when once established.

Fig. 231 (201).

Mouse-Ear. Hawkweed. *Hieracium Pilosella* L. An erect, thin-hairy, perennial, 10-30 cm. high, spreading by runners, juice milky; leaves mostly at the ground, oblong or spatulate; flowers yellow.

Introduced from Europe, having much the habit of *H. aurantiacum*.

Fig. 232 (203).

Marsh Elder. *Iva xanthiifolia* Nutt. Annual, coarse rough, light colored with minute down, 60-180 cm. high; leaves mostly opposite, ovate or rhombic, three-ribbed, more or less lobed; heads small, crowded in panicles. Waste places in the Upper Peninsula.

Fig. 233 (204).

Wild or Tall Lettuce. *Lactuca canadensis* L. A smooth, leafy biennial, 1-3 m. or more high, juice milky; leaves more or less lobed or simple, some of them 30 cm. long; heads 1-1.5 cm. long, numerous, in a large open panicle; flowers yellow.

Fig. 234 (205.)

Prickly Lettuce. *Lactuca Scariola* L. Biennial, erect, stiff, leafy, smooth, except near the base, juice milky, 60-200 cm. high; leaves narrow with spinulose margins, base more or less clasping, tending in open places to turn one edge up, the other down, and to point north and south; flowers pale yellow. A troublesome weed introduced from Europe.

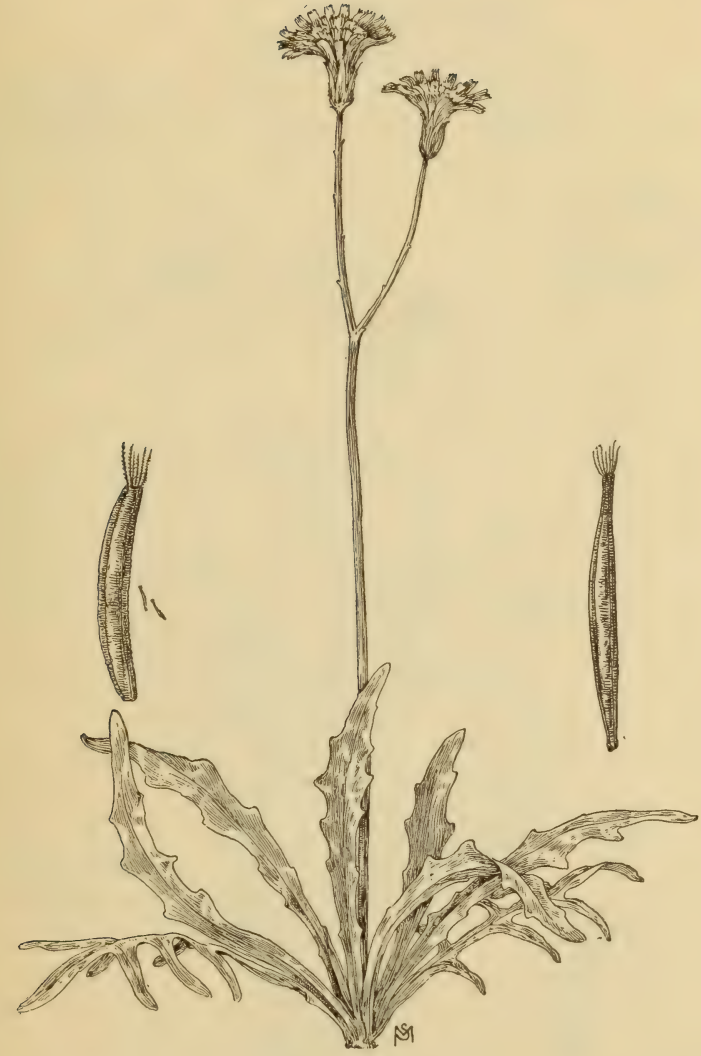


Fig. 235 (206).

Fall Dandelion. *Leontodon autumnalis* L. A smooth perennial, the flower stem slender, 10-60 cm. high, juice milky; leaves narrow, 3-8 cm. long.

Fig. 236 (207) .

Black-eyed Susan. Yellow Daisy. *Rudbeckia hirta* L. A very rough, bristly, hairy, erect, biennial, 30-80 cm. high; each stem bearing a single head; leaves narrow, 3-5-nerved; ray flowers orange yellow, often darker at the base, center of the head dark purple, very rarely green. Dry soil, a native in the state; introduced east mixed with clover seeds.

Fig. 237.

Stinking Willie. Staggerwort. *Senecio Jacobaea* L. Perennial, stout, often woolly, very leafy, 60-120 cm. high, having short, thick rootstocks; leaves usually 2-3-times lobed, 2-15 cm. long; heads very numerous in large compact, flat-topped clusters; flowers golden-yellow. Introduced from Europe and found in Maine, Nova Scotia, Quebec, locally in Ontario. Not yet known to occur in Michigan. The plant is very poisonous, causing a fatal disease of the liver in cattle. It is not injurious to sheep.

Fig. 238.

Canada Golden-rod. *Solidago canadensis* L. Stem erect, stout, usually minutely pubescent, 60-150 cm. high; leaves narrow, three-nerved, 6-13 cm. long; heads small, crowded in recurved one-sided racemes. A native plant; very common in low land, where it spreads rapidly by rootstocks. Several other species are just as bad when they are as abundant.

Fig. 239 (208).

Field Sow Thistle. *Sonchus arvensis* L. Chiefly smooth, a coarse weed. juice milky, 60-120 cm. high; spreading by rootstocks; leaves variously lobed, spiny-toothed; flowers yellow. Introduced from Europe and a rampant weed.

Fig. 240 (209).

Spiny-leaved Sow Thistle. *Sonchus asper* (L.) Hill. Chiefly smooth, except margins of leaves, juice milky, 30-90 cm. high; perennial; spreading by rootstocks and seeds; leaves prickly to the touch, not true of the other species; flowers pale yellow. Introduced from Europe.

Fig. 241 (210).

Common Sow Thistle. *Sonchus oleraceus* L. Annual, erect, branching, leafy below; juice milky, 30-180 cm. high; leaves soft-spiny, toothed; flowers pale yellow.

Fig. 242.

Common Dandelion. *Taraxacum officinale* Weber. (*Taraxacum Taraxacum* (L.) Karst.) Leaves, very variable, coarsely lobed and toothed; heads large (3-5 cm. broad), orange-yellow. See account of the following species.

Fig. 243 (211).

Red-seeded Dandelion. *Taraxacum erythrospermum* Andrz. Leaves, small, deeply lobed, segments narrow, juice milky; compared with the next species, heads smaller, 2-3 cm. broad, sulphur yellow, the inner bracts with horn-shaped appendages; achenes smaller; bright red or red-brown, sharply prickled above.

Fig. 244 (213).

Meadow Salsify. Yellow Goat's Beard. *Tragopogon pratensis* L. Very similar to the following species; leaves broader at the base; flowers yellow.

Fig. 245 (213.)

Salsify. Oyster-plant. *Tragopogon porrifolius* L. A stout, smooth, biennial, 45-90 cm. high, juice milky; leaves long and very narrow; flowers purple, showy.

Fig. 246 (214).

American Cocklebur. *Xanthium canadensis* Mill. A coarse, erect annual, 30-120 cm. high; leaves broad, usually three-lobed; burs nearly smooth, 14-17 mm. long, 5-8 mm. in diameter, beaks slightly curved, prickles scattered, slender, hooked.

Fig. 247.

Common Cocklebur. *Xanthium commune* Britton. Much like *H. canadense* beaks of bur incurved, prickles numerous, crowded, 3-6 mm. long, hairy, as is also the body.

Fig. 248 (215).

Spiny Clotbur. *Xanthium spinosum* L. Stems mostly pubescent much branched, 30-90 cm. high; leaves narrow and at the base of each a three-pronged, yellow spine. The drawing is a trifle stiff, and straight for nature.

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Ac-cum-bent, leaning or lying upon, applied to cotyledons when the caulicle (radicle) is folded against their contiguous edges.
A-chene, achenium, a small, dry, one-seeded, indehiscent fruit, likely to be mistaken for a seed.
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Fungi, produced by a fungus; pertaining to a fungus or to fungi, as a fungus disease. The substantive form fungus is also used as an adjective.
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Hispid, bristly.
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Loculus, the cavity of an ovary or anther.
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Lyrate, pinnatifid, with the lobes decreasing in size toward the base.
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Nutlet, a small nut or nut-like seed or fruit as many achenia.
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Oblanceolate, lanceolate in form, but tapering toward the base more than toward the apex.
Oblong, longer than wide with nearly parallel sides; compare oval.
Obovate, a flat body broader toward the apex than the base; see ovate.
Obovoid, a solid body broader toward the apex than the base. See ovoid.
Obtuse, having end or apex blunt.
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Oval, about twice as long as broad with regular curved outlines, broadly elliptical.
Ovate, like a longitudinal section of an ordinary hen's egg, with the attachment if any at the broad end.
Ovoid, the shape of a hen's egg and attached, if at all, at the large end.
Ovoid spike-rush 303
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Palea, Palet, the upper bract which with floral glume encloses the flower in grasses.
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Panicle, a branched or compound raceme; a cymose panicle has the main axis terminated by the oldest flower, its branches terminated by the next oldest.
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Parasite, a plant which grows upon or within another living body, from which it derives a part or whole of its nourishment; compare saprophyte.
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Pellucid, translucent.

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Petiole, the stem of a leaf.
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Pinnatifid, pinnately veined with marginal divisions reaching about half way to the mid-rib.
Placenta, a part of the ovary to which the ovules or seeds are attached.
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Root stock, rizome, a stem usually subterranean and more or less thickened, producing young branches.
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Runner, a prostrate branch which roots and forms new plants at intervals, as the strawberry.
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Sessile, having no stem, as a leaf without a petiole or a flower without a pedicel.
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Spikelet, a small or secondary spike as found in grasses.
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Tubercle, a swollen part or a root due to bacteria. Usually applies to such as possess the power to fix nitrogen; a little tuber.
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Twining, ascending or coiling the stem in a spiral manner around a support; voluble.
Umbel, an inflorescence in which there is one flower to a pedicel, and these are all of nearly equal length and all start from nearly the same place at the apex of the stem.
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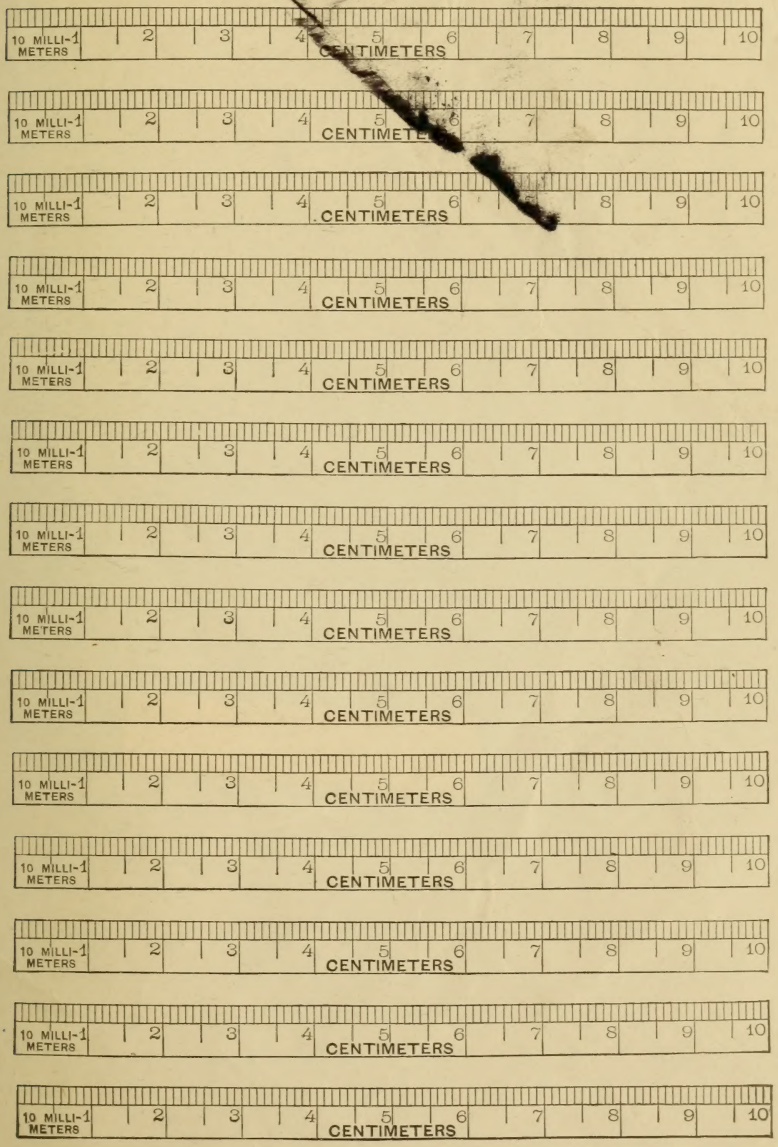
☞ If not familiar with the decimal scale used in recording measurements in this volume, the reader can clip out one of those found below and use it for measuring.



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